

EXHIBIT 1

EXHIBIT 2

EXHIBIT 3

EXHIBIT 4

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD., a U.K. corporation,
Plaintiff,

v.

QUALCOMM INC., a Delaware
corporation, QUALCOMM
TECHNOLOGIES, INC., a
Delaware corporation, and NUVIA,
INC., a Delaware corporation,
Defendants.

C.A. No. 22-1146 (MN)

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OPENING EXPERT REPORT OF DR. ROBERT P. COLWELL

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I. INTRODUCTION

1. My name is Dr. Robert P. Colwell, and I have been retained as an expert witness on behalf of the Plaintiff Arm Ltd. in this matter. I understand that Arm has sued Defendants Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc. in the District of Delaware in the case captioned *Arm Ltd. v. Qualcomm Inc. et al.*, No. 1-22-cv-001146-MN (D. Del.). I am being compensated for my time in connection with this proceeding at \$650/hour. My compensation is not dependent on the substance of my opinions, my testimony, or the outcome of this proceeding.

2. I have been asked to analyze whether certain Qualcomm CPU cores incorporate technology developed by Nuvia under the Nuvia Architecture License Agreement (“Nuvia ALA”), [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3. As discussed further below, it is my opinion that:

(i) The [REDACTED] core initially developed by Nuvia (a) was designed to be

[REDACTED]

[REDACTED]; (b) implements the Arm instruction set and other components of

[REDACTED]; and (c) was validated as an

Arm [REDACTED].

(ii) Qualcomm incorporated substantial parts of the Nuvia-designed [REDACTED]

core into later versions of the [REDACTED] core used in certain Qualcomm

System-on-Chip (“SoC”) products, including the [REDACTED] core, the [REDACTED] core, and the [REDACTED] core.

(iii) While I understand that Qualcomm claims it swapped out certain Arm IPs from its products following Arm’s termination of the Nuvia licenses, the documents and testimony provided by Qualcomm indicate that [REDACTED]

[REDACTED]

[REDACTED]

4. I base my opinions on my extensive experience in the industry; experience with Arm technology; my review of documents produced in this litigation; my review of deposition transcripts; my review of discovery responses; a conversation I had with Arm Chief Architect Richard Grisenthwaite on December 13, 2023; source code produced by Qualcomm; and other materials. I also reviewed the Expert Report of Dr. Shuo-Wei (Mike) Chen submitted in this case. I include a list of materials considered in Appendix A to this report.

II. EXPERIENCE AND QUALIFICATIONS

5. I am a technical expert in the field of computer engineering and microprocessor design. I am also an industry expert in those fields. I attach a copy of my *curriculum vitae* as Appendix B to this report, which describes my relevant experience, including academic and employment history, publications, professional activities, and speaking engagements.

6. I received a B.S. degree in Electrical Engineering from the University of Pittsburgh in 1977. I received an M.S. degree in Computer

Engineering from Carnegie Mellon University (CMU) in 1978, followed by a Ph.D. in Computer Engineering from CMU in 1985.

7. From 1977 until 1980 I worked for Bell Laboratories in Holmdel, New Jersey as a hardware design engineer developing 8- and 32-bit microprocessors. My specific responsibilities included design and support of their in-circuit emulators, and design and timing analysis of interchip signaling protocols.

8. From 1980 until 1984, while obtaining my Ph.D., I worked part time for Perq Systems in Pittsburgh, Pennsylvania, as a hardware design engineer working on high-resolution graphics display hardware for first generation bit-slice-based workstations.

9. From 1985 until 1990, I worked at Multiflow Computer in Branford, Connecticut, as a hardware design engineer creating the world's first VLIW (very long instruction word) scientific supercomputer. Multiflow sold about 125 such systems at an average selling price of \$200K.

10. From 1990 to 2001, I held various positions at Intel Corp. in Hillsboro, Oregon, including Senior CPU Architect and Chief Architect (for Intel's IA-32, also known as x86). As part of my responsibilities at Intel, I co-invented Intel's P6 microarchitecture, productized as the Pentium Pro, which also formed the core of the Pentium II, the Pentium III, Celeron, Xeon, and Centrino families, as well as the Pentium 4. P6 microarchitecture features are still very influential today in Intel's top-of-the-line Core i3, i5, i7,

i9, and X-series processors. In addition, I led Intel's overall x86 Pentium CPU architecture endeavors across multiple chip developments. I was honored to be named an Intel fellow in 1997 in recognition of my contributions to the P6 microarchitecture development. Overall, I worked with and spent 11 years leading a large industrial microprocessor design team at Intel, which by the late 1990s included more than 850 engineers.

11. Along with the x86 chip development work, in my role as Intel's Chief Architect, I also tracked current and emerging competition in the microprocessor product space. Although Arm Inc. products were not performance-competitive with Intel's chips in the 1990's, I paid attention to Arm because my personal conviction in the late 1990's was that low-power and low-cost processors would increasingly be required in the future mobile computing platforms that I was sure would emerge (which turned out to primarily take the form of smartphones and tablets). I analyzed the ARM instruction set, core performance, and software tool availability (compilers, debuggers, simulators), as well as projected licensing costs and support models. The conclusion I reached at the time, and still hold today, is that a capable design team could use the ARM instruction set to design Arm-compliant processors that would challenge the best processors from Intel

or AMD in every market segment. My conclusion ended up being correct, as evidenced by Apple's introduction of the M-series processors.¹

12. While at Intel, I also paid attention to Qualcomm, because I found it worrisome that we at Intel had a processor product line that had little to offer the coming mobile computing markets. Intel had no suitable x86 cores to sell to those low-power markets, and no ability to license x86 cores to Qualcomm, even if we had those cores in our product line. Given Qualcomm's long history in the cell phone industry, which is necessarily a mobile and battery-operated environment, the SoC paradigm looked to be a natural fit to serve as the basis for those mobile products. SoCs are space-efficient, incorporating most of the necessary system functions on a single chip, and power-efficient because electrical interconnections are short and the SoC designers can optimize the SoCs' functions rather than having to use whatever is available. SoCs require, among other things, one or more CPUs, each with one or more processor cores. Licensing cores from a company dedicated to developing those cores is an effective solution compared to creating and permanently maintaining a CPU core development team so that each new generation remains performance competitive.

13. I became a self-employed industry consultant in 2001, working with computer industry clients such as Safeware, the University of

¹ Hassan Mujtaba, *Apple M1 ARM 8 Core CPU Is Faster Than Intel & AMD's Fastest 8 Core Chips in Single-Core Performance Benchmark*, WCCFTECH (March 25, 2021), <https://wccfttech.com/apple-m1-arm-8-core-cpu-faster-intel-amd-fastest-8-core-chips-single-core-performance/> (last visited December 19, 2023).

Pittsburgh, Intel, venture capital companies, various expert witness engagements, and the U.S. Department of Defense (DoD).

14. In 2011, I joined DoD's Defense Advanced Research Projects Agency (DARPA) as deputy director of the Microsystems Technology Office (MTO). DARPA is the U.S. government's premier defense-related funding agency, specializing in high-risk and high-reward technologies for the U.S. military. A year later I became MTO's director, until my departure in April 2014. MTO had an annual budget of approximately \$600M, and my job as office leader was to invest that money in promising new technologies for the DoD, including new energy-efficient computing systems, modular and adaptable radars, position/navigation/timing systems for GPS-denied environments, computer-mediated prosthetics for military (and civilian) amputees, traumatic brain injury detection devices for soldiers, fused multiple-band night vision sensors, extremely high-power lasers, and much more.

15. I have authored numerous publications including books, chapters in books, journal papers, and numerous patents (40) associated with computer hardware and processor design. My *curriculum vitae* includes a list of all the publications I have authored in the last 10 years. Many of these publications concern the design of microprocessors and computer systems. I have also been an editor for Institute of Electrical and Electronics Engineers (IEEE) publications, as well as a columnist and author.

16. I have received multiple awards, including the 2005 Eckert-Mauchly Award for “outstanding achievements in the design and implementation of industry-changing microarchitectures.” The Eckert-Mauchly Award is generally viewed as the highest recognition in the field of computer architecture. In 2006, I was elected to IEEE Fellow and inducted into the National Academy of Engineering for contributions to turning novel computer architecture concepts into viable, cutting-edge commercial processors. In 2012, I was inducted into the American Academy of Arts and Sciences (AAAS). Other inductees in my AAAS “class” that year included Sir Paul McCartney, Hillary Rodham Clinton, and Mel Brooks. In 2015, I received the Bob Rau Award from the IEEE for “contributions to critical analysis of microarchitecture and the development of the Pentium Pro processor.”

III. BACKGROUND AND OPINIONS

A. Microprocessor Industry

17. A microprocessor is a computer on an integrated circuit, also known colloquially as a “computer chip.” The “micro” part of the word “microprocessor” refers to the physical size of the processor. At the time the term microprocessor was coined (1971), computer systems were the size of several full-sized refrigerators, while the microprocessor was the size of a pack of chewing gum. Regardless of size, all such processors can fetch and execute machine instructions from main memory. A microprocessor is also known as a “CPU,” or Central Processing Unit. A new term for

microprocessors, “core,” has come into vogue since the burgeoning number of transistors afforded by Moore’s Law enabled the industry to put more than one CPU onto a single integrated circuit. By convention, the product is still called a microprocessor, but there can be multiple cores within that processor, each capable of independently fetching and executing its own instruction stream. These multiple independent cores may share certain facilities such as a common cache, an on-chip network, access to main memory, and an input/output interface.

18. Other components of a modern computer system, such as those in a smartphone, can also be integrated onto the same silicon as the cores, yielding a product conventionally called a System-on-Chip, or SoC.

19. Microprocessors and SoCs are now ubiquitous in everyday life and are no longer found just in computer systems, phones, and tablets. Modern automobiles have many different processors, from entertainment systems, security systems, engine controllers, antilock brake controllers, transmission controllers, to the key fob that opens the doors. Likewise, today’s homes are rife with computing horsepower: processors run the microwave, washing machine, dryer, furnace, TV, router, cable modem, and even light switches and flashlights.

20. The International Trade Commission (ITC) estimates the size of the global information technology (IT) sector to be \$5T and more than 10% of

the U.S. gross domestic product.² Several of the largest companies in the world are heavily IT-centric. By some metrics, Apple is #1 with the largest market cap at \$2.65T. Microsoft is #3 with a market cap of \$2.1T, Alphabet (Google) at #4 with \$1.54T, Amazon at #5 with \$1.42T, NVIDIA with \$1.06T, Tesla at #6 with \$910B. By contrast, Toyota, a more conventional manufacturing company, has a market cap of \$236B. The entire U.S. movie industry revenue in 2022 was \$41.7B, and the music industry at \$19.1B in 2020, while the high-tech video game market was valued at \$159.3B in 2020, three times higher than movies and music combined.³

21. It is important to realize that new computer technology does not just afford incremental improvements to existing products or markets, but also enables entirely new markets and products. For instance, the Internet came into existence when computers became fast enough, and inexpensive enough, to handle the data traffic. Smartphones became feasible products when processors became fast enough to execute useful applications at power levels that did not quickly drain the battery.

² David Coffin et al., *The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry*, U.S. INTERNATIONAL TRADE COMMISSION (USITC) (June 2022), https://www.usitc.gov/publications/332/working_papers/the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry_final.pdf (last visited December 19, 2023).

³ Gavin Divers, *Gaming Industry Dominates as the Highest-Grossing Entertainment Industry*, GAMERHUB (January 24, 2023), <https://gamerhub.co.uk/gaming-industry-dominates-as-the-highest-grossing-entertainment-industry/#:~:text=To%20put%20that%20in%20perspective,much%20as%20the%20movie%20industry> (last visited December 15, 2023).

2. Microprocessor Architectures.

22. A computer instruction set architecture (ISA) is the list of instructions that a compatible processor is able to execute, plus other information needed by an assembly language programmer, such as the number and width of the machine's registers, addressing modes, control register descriptions, supported data types (*e.g.*, integers, single and double precision floating point, and strings), as well as the actual bit-for-bit encoding of the instructions.

23. A computer instruction is an operation that a given processor “knows how to perform,” encoded into a pattern of bits that the processor can decode and execute. A canonical example might be an integer add instruction. For the Arm ISA, the corresponding “opcode” would be called ADD, and the overall instruction would specify the two source registers whose contents are to be added together, plus a destination register indicating where the sum is to be written. If the data to be added happened to reside in main memory, two memory loads would have to first be performed to get the data into the registers. The much more complicated Intel x86 architecture, by contrast, allows the ADD instruction itself to access memory for one of the source values, and the destination can also be memory.

24. ISAs such as Intel's x86 architecture comprise hundreds (or thousands, depending on how one counts) of instructions, which include simple instructions but also much more complicated operations that require microcode (a kind of computer-within-the-computer code) for their

implementation. This type of ISA is known as complex instruction set computers (CISC).

25. Originally, Arm's ISA had only a few dozen instructions and adhered to a design philosophy known as reduced instruction set computers (RISC). Subsequently, the Arm ISA has added several hundred more instructions with Armv8. The Arm ISA can directly access 16 registers from user mode, while the x86 architecture has only 4 such registers, with a few others that are dedicated to certain activities, plus some vestigial segment registers. Arm has two operating modes, user and privileged, while x86 has a more elaborate ring mechanism.

26. Below is a screenshot of a few exemplary instructions from the Arm A64 Instruction Set (described in the Arm ARM), including the ADD instruction previously discussed. The ADD instruction, as discussed above, simply adds two data values together and puts the sum into a destination register. (The "immediate" tag on these particular instructions signifies that one of the data values to be added is not in a register but is contained within the instruction encoding itself, making it "immediately" available to the hardware adder.) The ADDS instruction does exactly the same operation as ADD, but also sets some one-bit result (also called "status") flags such as Zero, Negative, Carry, and Overflow. The SUB and SUBS instructions are just like ADD/ADDS except that they perform subtraction instead of addition. Compare instructions set the result flags according to whether one data value

is larger or smaller than the other one, and the result flags are generally used by subsequent conditional branches.

Table C3-42 Arithmetic instructions with an immediate		
Mnemonic	Instruction	See
ADD	Add	<i>ADD (immediate)</i> on page C6-883
ADDS	Add and set flags	<i>ADDS (immediate)</i> on page C6-891
SUB	Subtract	<i>SUB (immediate)</i> on page C6-1455
SUBS	Subtract and set flags	<i>SUBS (immediate)</i> on page C6-1466
CMP	Compare	<i>CMP (immediate)</i> on page C6-982
CMN	Compare negative	<i>CMN (immediate)</i> on page C6-976

Figure 1: Arithmetic Instructions from Arm A64 Instruction Set. (ARM_01324149 at -390.)

27. The Intel x86 ISA evolved largely as a competition between one generation of CPUs and the next generation – if a new Intel chip was not compellingly faster than the existing one, the new one would not command a profit margin high enough to underwrite the next generation of fab equipment. While Intel chip designers still had to balance multiple competing factors in creating a new chip, such as performance, power dissipation, product cost, schedule, and risk of design errata, performance generally came first among design goals. It was my experience that the last 10% of performance gain in a design comes at a disproportionately large cost in power and design effort. The Arm ISA, by contrast, explicitly aimed to enable compatible implementations that emphasized good performance at

outstanding power efficiency, an excellent recipe for the computational elements underlying smartphones and tablets.

28. Developing a new ISA requires achieving a subtle and extremely complex balance among many competing concerns. Beyond a minimal set of instructions that any ISA would be expected to have (integer ADD, for example), designers could choose to add more instructions, attempting to provide hardware to support high-level functions in the user code for best performance. But it can be difficult for a compiler to spot opportunities to use those specialized instructions, and meanwhile, the bit encodings of the instructions will be necessarily larger, thus potentially compromising other aspects of the machine, such as cache performance. It is also quite easy to (intentionally or otherwise) embed certain aspects of the current microarchitecture into the ISA itself, which then requires all future implementations of that ISA to re-implement them, possibly to their detriment.

29. But perhaps the biggest challenge facing an ISA designer has to do with his or her motivation for attempting a new ISA design in the first place. There would have to be some very compelling reason why that designer believes it would be worth the enormous expense and risk of attempting to develop a custom ISA. That designer must therefore achieve the delicate balance required of any ISA while also maintaining the compelling innovation aspect of the new ISA, along with development of the

software tools (itself a gargantuan task), documentation, training, and creation and maintenance of validation suites. Another way to look at this is that, even if an existing ISA is not perfect for a particular implementation and therefore foregoes some potential performance or power savings, it is not a given that a new ISA could do so much better that performance alone could be a sufficient motivation for a new ISA development. In my career, I have had the opportunity to help develop a new ISA (at Bell Labs and Multiflow Computer), and as Intel's chief x86 architect, I oversaw the addition of hundreds of new instructions to x86 to keep the performance of x86 chips competitive. Indeed, the x86 ISA was considered doomed in the 1980s by most computer architecture researchers, who believed it was too archaic even then to remain competitive. Forty years later, with continuous development, it is still one of the most popular and profitable ISA for servers, desktops, and laptops.

30. Most system architects choose to license existing ISAs for the CPU parts of their new product. Rather than waste time and incur project risk by developing a new ISA, they can invest their limited time and resources in optimizing other essential aspects of the system: cache design, placement, policies, sizes and speeds; memory size, controller features, and power/performance tradeoffs; system power management and power-efficient operating states; and hardware accelerators for important functions or emerging applications. When they finish and begin marketing their new

CPU, being able to stamp the Arm-compliant imprimatur can be extremely valuable, because it raises the confidence of a prospective CPU purchaser concerning the maturity of the design, the tools available (and quality thereof), what backup plans might be feasible, and much more.

31. While SoC technology has been around since the 1970s, continuing advances in chip implementation technology, combined with steadily increasing user expectations, have converged to make SoCs the technology of choice. An SoC is at the heart of every smartphone, Apple or otherwise. An SoC, as exemplified below,⁴ is a combination of IP blocks for specific functions, comprising such modules as one or more CPU cores, a graphics processor, DRAM interfaces, a power management unit, and various I/O standard interfaces, all on a single chip.

⁴ *NVIDIA and Qualcomm ARM Up Against Competitors*, BERKELEY DESIGN TECHNOLOGY, INC. (October 18, 2011), <https://www.bdti.com/InsideDSP/2011/10/20/NvidiaQualcomm> (last visited December 19, 2023).

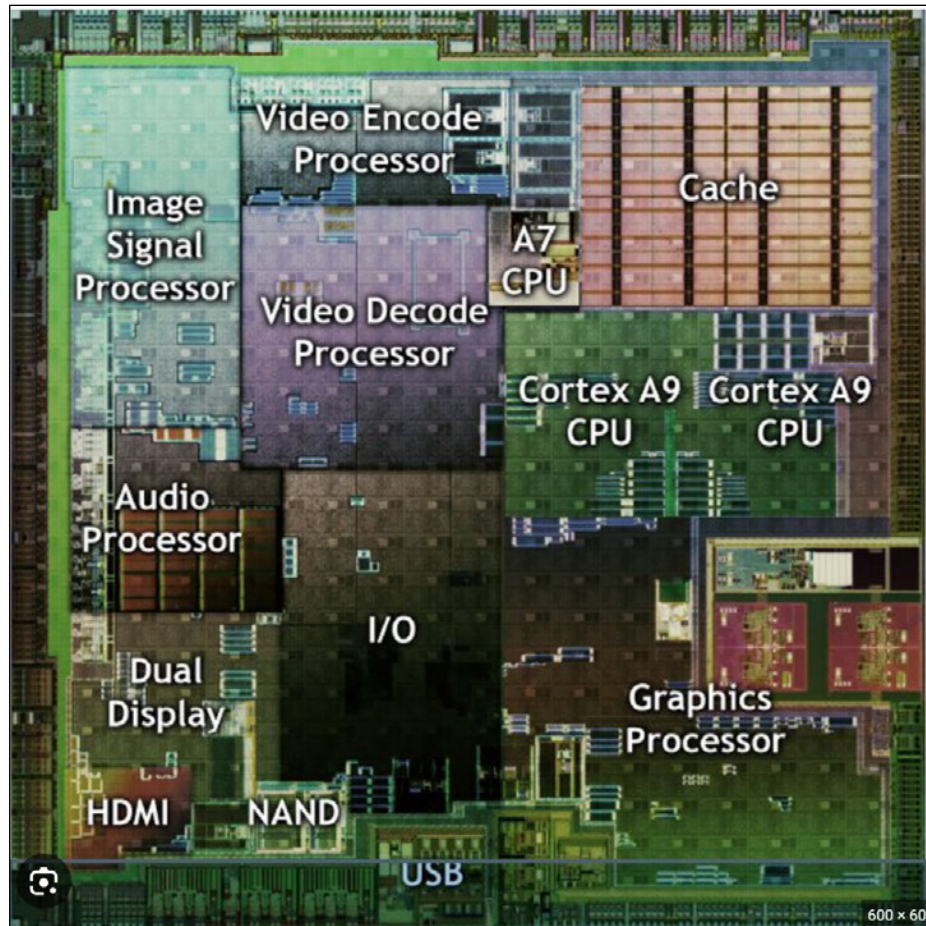


Figure 2: SoC showing various IP blocks and two CPU cores.

32. Systems with as many required features as modern SoCs rely heavily on industry standards to help manage that complexity. Today's SoCs have several different radio transmitter/receivers, and each of them corresponds to an industry standard, so that the final SoC will allow the user to successfully contact the cell phone tower, the local WiFi network(s), and a Bluetooth device attempting to pair with it. Similarly, there are industry standards for touchscreens, USB cables, batteries, chargers, and many other aspects of an SoC-based product. From a product designer's point of view, being compatible with communications standards is absolutely required:

buyers of their product will expect their new smartphone to reliably talk to cell phone towers using the appropriate cell phone radio protocols, send and receive data (and device charging current) via a USB cable, connect to nearby printers and headphones via Bluetooth, and so on.

33. One of the other choices the SoC designer will make concerns the ISA of the general processor (or processors, in the case of multiple cores) on the SoC. They will choose one of three options: (1) adopt an existing ISA such as Arm's ISA; (2) start with a "blank sheet" and design their own ISA (the "full custom" option); or (3) start with an existing ISA and modify it. The full custom option (2) is much more expensive than the other two, both in design and software tools support, and is risky. The first option is the most expedient and has a great deal to recommend it – for a reasonable licensing fee, the designer can license a known-working core (such as an Arm-designed core) that is compatible with the desired ISA, along with the software tool chain required to use it. There is broad industry acceptance of (1), as numerous companies license cores from Arm, including Nuvia, which had a TLA agreement. Some customers may want to add some feature or instruction to an existing ISA (option (3)), which retains the advantages of option (1) at a small cost in new software tool development, potentially resulting in a valuable product differentiation opportunity, but at the cost of additional development and permanent maintenance overhead.

34. The CPU is often described as the “brains” of a system. It executes a program that allows it to control the SoC: it oversees management of the battery subsystem, it runs whatever application(s) the user has indicated, it controls the display and reads the touchscreen inputs, and so on. CPUs work by “fetching” or retrieving an instruction from memory, decoding that instruction, performing the indicated operation, and then deciding what instruction is to be done next (which is usually the next sequential instruction in memory).

35. The CPU is designed to correctly perform all instructions from an “instruction set” using various machine resources such as registers (fast temporary storage), control/configuration registers, operating system facilities such as translation lookaside buffers, main memory, and input/output (I/O). CPUs must also strictly follow the ISA’s design for how to handle faults (such as divide-by-zero errors) and illegal instructions.

36. An instruction set is a collection of instructions that the CPU can perform, along with whatever information an assembly language programmer would need. Aside from the list of valid instructions, an assembly language programmer would need to know how many registers there are and whether any of them have side effects. They would also have to know how the ISA handles “memory semantics” (special rules one must follow to successfully interact with main memory), supported data types (such as integer, floating point, and strings), and the maximum size of virtual

and physical addresses. If a designer is developing a custom CPU core that is compliant with a particular ISA, the CPU design will need to comply with the constraints and requirements of that ISA.

37. CPUs can only perform instructions from the set of instructions for which they were designed. An Arm-compliant CPU cannot execute code for an x86, nor can an x86 processor execute Arm code. Both Arm and x86 have their own lists of instructions, Arm's list being shorter than x86's, each instruction encoded in its own way. If a processor fetches an instruction, and upon trying to decode that instruction discovers that the fetched bit pattern does not correspond to any of the instructions it understands, then the processor will perform a special maneuver called an "illegal instruction trap" and will terminate the application in which the illegal instruction appeared. Due to these issues of compatibility, it is imperative for designers to adopt an ISA that is broadly used, like the Arm ISA.

38. A microprocessor's ISA is often referred to by the shorthand "architecture"; *e.g.*, one might speak of the Intel Architecture or Arm Architecture. It is important to realize that any given architecture can be implemented in any number of different ways, each of them delivering different combinations of performance, power, cost, and size, while remaining compliant with the ISA.

3. Microprocessor Development.

39. A CPU architecture can be viewed as an abstract set of rules describing the interface between hardware and software – the interface as

seen by an assembly-language programmer. A CPU *microarchitecture*, by contrast, is the set of hardware functional blocks and protocols between those blocks that jointly implement the CPU architecture. A given CPU architecture may be implemented in a microarchitecture that optimizes performance above all else, including at the expense of high power and high product cost which would make it suitable for supercomputers and high-end servers. Conversely, that same CPU architecture can be realized via a different microarchitecture optimized for low power and long battery life, as required by mobile platforms such as tablets, smartphones, and laptops.

40. A CPU microarchitecture is implemented in a specialized low-level programming language called register transfer language (RTL). Examples of RTL include Verilog and VHDL. During development of a CPU core, a computer engineer uses a computer workstation to write and edit the RTL, adding new features or fixing errors. Then her work would be combined with that of her co-designers to constitute the current design. After innumerable such edit/fix/add/test sessions, the aggregate design will have implemented all necessary functionality to be considered compliant with the intended ISA. Automated software tools then translate the RTL into circuits and interconnections on the actual silicon substrate.

41. While the designers are modifying their RTL to complete the design and remove errors, a validation team is testing that RTL against legacy tests, random tests, and test suites. Design errors caught during RTL

development are generally orders of magnitude less expensive to ameliorate than “bugs” that escape into product deployment. It is easy to overlook the crucial role that validation plays in a processor development. As one CAD vendor put it: “In the field of electronics . . . verifying a design is universally the most critical aspect of a project. This applies to microprocessor design as well. Microprocessor designers generally require more time to verify their design than all other [design] steps combined.”⁵

42. It is not possible to test every bit pattern against every instruction against every possible exception condition – there are far too many combinations to try them all, even on the fastest computers. Instead, validation engineers use their intuition and experience to wield validation test suites, random testing, bespoke software tests, emulation systems, and large server farms, to help decide when a design has matured to the point where production can be considered. When the design team has finished RTL coding, and validation and management give the go-ahead, production commences.

43. Production consists of transferring the RTL database, through a set of electronic design automation tools, to a fabrication plant such as TSMC. There, the fab engineers will run the incoming RTL design through their own set of rigorous checks, looking for silicon design rule errors that

⁵ *The Microprocessor Chip: Design Guidelines, Functionality, and Characteristics*, CADENCE PCB SOLUTIONS (2020), <https://resources.pcb.cadence.com/blog/2020-the-microprocessor-chip-design-guidelines-functionality-and-characteristics> (last visited December 19, 2023).

would impact yield (such as on-chip wires that are too close together or inadequate power/ground planes). When the fab engineers are satisfied, the actual photochemical processing of making a silicon chip begins.

44. Silicon processing is performed on wafers, thin disks that can hold dozens or hundreds of individual chips. After many steps and having traversed many large photochemical “tools” within the fab, the wafer processing eventually completes. The fab then performs quick tests on each die on the wafer and marks any die that fails so that further effort will not be wasted on it. The remaining dice are cut from the wafer and tested further. Those that survive will be packaged for sale to customers.

4. Business Models for Licensing Microprocessor Architectures

45. As outlined above, SoC designers have several fundamental options to consider, including which ISA their CPUs will be compliant with. There are only a few available ISA choices: Arm, RISC-V, and potentially (in the future) x86.

46. Arm is the gold standard for licensing ISAs and ISA-compliant cores. It has been in the ISA business for 33 years and has successfully developed multiple versions of its ISA (the latest is version 9) and numerous Arm ISA-compliant cores. Where RISC-V is open-source, meaning all intellectual property within the ISA and tools are publicly available and royalty-free, Arm is closed-source: buy the license and use the tools, but be subject to Arm’s license requirements. In exchange, the licensee gets

consultation, documentation, guidance, and a relatively low-risk development path.

47. There are other advantages to an Arm license. The first is the intangible benefit of partnering with a company that has helped many others develop a successful product in the high-tech marketplace, and therefore is in a good position to evaluate a licensee's plans for new features and technical risks. A second is Arm's comprehensive portfolio of available technologies for other aspects of the licensee's product, such as on-chip interconnects that work well with the Arm ISA, and extensive validation suites that not only check architectural compliance but also serve as a thorough check on basic correctness of a new CPU implementation. Indeed, when Arm judges a new processor to be Arm-compliant, it is not just the processor designer's reputation at stake, it is also Arm's own reputation, which is a valuable endorsement for a chip design company, especially one with no previous track record.

48. RISC-V is a new ISA contender that is currently emerging with one major selling point – it is free. As one designer put it, “[i]f you wanted to make a CPU and you're not AMD or Intel, there are two real choices: ARM and RISC-V.”⁶

⁶ Matthew Connatser, *ARM vs. RISC-V: Is one better than the other?* DIGITALTRENDS (May 31, 2022), <https://www.digitaltrends.com/computing/arm-vs-risc-v/> (last visited December 15, 2023).

49. RISC-V was designed from the start to be “open source” – freely available and usable now and in the future. Support for the RISC-V open-source ISA may carry challenges. When a bug is found in a core design or in a critical software tool, who fixes it, and on what schedule? If a required feature is currently missing from a tool, who will develop that feature and maintain it, and when? If support is needed by a designer who has questions, who provides reliable answers on an urgent basis? Are future-looking ISA extensions being actively researched so that the RISC-V ISA will become and remain competitive in the future? RISC-V advocates argue that ISA customization will be increasingly important in a power-constrained future. Detractors point out that there is no guarantee that such innovations will be generally available, there being no requirement that RISC-V users share their advances. Both sides cite “fragmentation” where open-source users all run off in different directions with little central coordination (witness the wild proliferation of various Linuxes). RISC-V argues that it’s a good thing, allowing for innovation, while closed-source fans prefer standardization. All of this uncertainty adds up to considerable risk to a project development.

50. Qualcomm’s Manu Gulati (co-founder of Nuvia) stated that RISC-V is “in its very early stages” and “is not that mature today.” (Gulati Dep. Tr. 38:20-22, 39:4-7.) “Risk 5 is today where ARM ecosystem was, like, more than 10 years ago. So it is not ready for someone coming up with . . . a full-blown server product with all the software and the tool chains and OSes

and everything that we've been talking about for software. It is not ready for that." (*Id.* at 38:22-25, 39:1-4.)

51. Intel has announced that it will begin x86 core licensing soon, but for the past 30 years, it declined to make x86 available and guarded its ISA zealously, so whether reasonably priced x86 cores at competitive performance and availability will appear is currently unknown.

B. Parties

1. Arm

(i) Company Background

52. Arm was established in 1990 with the goal of developing computer processors that were highly power efficient. Prospectus⁷ at 3. By the mid-1990s, Arm-based processors had gained traction in mobile phones due particularly to the energy efficiency of the processors. (*Id.*)

53. Arm's success with mobile phones has grown substantially over the years. Arm's technology is now present in 99% of the world's smartphones. As of the beginning of 2023, Arm estimates that its technology is present in 250 billion processors worldwide and that approximately 70% of the world's population uses Arm-based products. (*Id.* at 11.)

54. Arm is a major technology company, with annual revenue of approximately \$2.6 billion and almost 6,000 full-time employees. (*Id.* at 12.)

⁷ Arm Holdings plc., 95,500,000 American Depositary Shares (Representing 95,500,000 Ordinary Shares) (Form SEC-424B4) (September 13, 2023), <https://www.sec.gov/Archives/edgar/data/1973239/000119312523235320/d550931d424b4.htm> (last visited December 15, 2023) (hereafter "Prospectus").

About 80% of Arm’s employees are devoted to research and development (R&D) (*id.*), and the company spends approximately \$1.3 billion per year on R&D efforts (*id.* at 110). Arm has business relationships with some of the world’s biggest technology companies, including Apple, Samsung, Amazon, Mercedes Benz, and Siemens AG. (*Id.* at 14.) Arm is an owner or co-owner of approximately 6,800 issued patents. (*Id.* at 20.)

(ii) Arm Architecture

55. Arm’s R&D efforts include developing and improving the Arm architecture, which Arm licenses to customers who wish to develop their own Arm-compliant custom cores under an Architecture License Agreement (ALA). Arm also provides development tools to assist ALA customers with implementing the Arm architecture in custom Arm-compliant cores.⁸

56. The Arm architecture includes the set of instructions that an Arm-compliant processor must be able to execute. These Arm instructions form the basis of the ISA. In addition to the required instructions, the Arm ISA includes other information that is needed to execute the instructions, such as information about registers that store data, encoding of data, and supported data types. The Arm architecture further includes information about exception detection and handling addressing modes, memory access ordering, special register semantics, operating system support functions, control registers, rules for co-processors, context swap information,

⁸ ARM, <https://www.arm.com/products/development-tools> (last visited December 15, 2023).

interrupts, breakpoints, boot procedures, privileged modes, various abort vectors, security features, fencing and atomic operation support, and memory alignment restrictions. Arm has offered a number of versions of its ISA over the years, with the latest being version 9.⁹

57. The Arm architecture is described in documentation provided by Arm, specifically the Arm Architecture Reference Manual, sometimes called the “Arm ARM.” Arm also provides other documentation and technical support to its customers to help them develop processors that embody the Arm architecture and other Arm technology.

58. Based on my discussions with Arm Chief Architect Richard Grisenthwaite, the Arm ARM is the authoritative document that defines the Arm architecture. It is thousands of pages long and contains more information and detail than any engineering team could recall with precision. Thus, any engineering team designing a custom Arm-compliant core would need to regularly consult the Arm ARM and implement its contents in the RTL code design for the custom Arm-compliant core. Mr. Grisenthwaite noted that [REDACTED]

[REDACTED] The Arm ARM contains a great many technical details concerning the Arm architecture that need to be correctly implemented in a core for it to be Arm-compliant.

⁹ ARM, *Arm CPU Architecture: A Foundation for Computing Everywhere*, <https://www.arm.com/architecture/cpu> (last visited December 15, 2023).

59. The types of information included in the Arm ARM includes the number, types, and any special aspects of the general register set; an introduction to the architecture and the instruction set; a discussion of the Programmer's Model (general information for an assembly language programmer, such as modes, exceptions, and synchronization primitives); details of the memory hierarchy design, including caches, write buffers, exceptions, and the like; architectural provisions for incorporating co-processors; features and design choices built into the virtual addressing mechanism; extensive discussions about the new floating point vector instructions and their use; and coverage of the built-in Debug Architecture.

60. While the Arm ARM is a publicly available document, I understand that the technology described in the Arm ARM is protected at least by patents and copyrights, as discussed below. Even though it is publicly available, the Arm ARM is still the subject of license restrictions with individual customers. For example, version G.b of the Arm ARM (ARM_01324149) includes the following restrictions:

Proprietary Notice

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(ARM_01324149 at -150.)

Confidentiality Status

This document is Non-Confidential. The right to use, copy and disclose this document may be subject to license restrictions in accordance with the terms of the agreement entered into by Arm and the party that Arm delivered this document to.

(ARM_01324149 at -151.)

61. Arm updates the Arm ARM periodically as it continues to develop and improve upon the Arm architecture. Arm releases different versions of the Arm ARM to describe updated features. The second page of the document lists the various versions and identifies the changes from the prior version.

03 June 2016	A.j	Non-Confidential EAC	EAC release
30 September 2016	A.k	Non-Confidential Armv8.0 EAC	Updated EAC release
31 March 2017	B.a	Non-Confidential Armv8.1 EAC, v8.2 Beta	Initial release incorporating Armv8.1 and Armv8.2
26 September 2017	B.b	Non-Confidential Armv8.2 EAC	Initial Armv8.2 EAC release, incorporating SPE
20 December 2017	C.a	Non-Confidential Armv8.3 EAC	Initial Armv8.3 EAC release
31 October 2018	D.a	Non-Confidential Armv8.4 EAC	Initial Armv8.4 EAC release
29 April 2019	D.b	Non-Confidential Armv8.4 EAC	Updated Armv8.4 EAC release incorporating accessibility changes
05 July 2019	E.a	Non-Confidential Armv8.5 EAC	Initial Armv8.5 EAC release
20 February 2020	F.a	Non-Confidential Armv8.6 Beta	Initial Armv8.6 Beta release
31 March 2020	F.b	Non-Confidential Armv8.5 EAC, v8.6 Beta	Armv8.5 EAC release, initial Armv8.6 Beta release
17 July 2020	F.c	Non-Confidential Armv8.6 EAC	Initial Armv8.6 EAC release
22 January 2021	G.a	Non-Confidential Armv8.7 EAC	Initial Armv8.7 EAC release
22 July 2021	G.b	Non-Confidential Armv8.7 EAC	Updated Armv8.7 EAC release

(ARM_01324149 at -150.)

62. An ALA allows a customer to develop its own customized core that is compliant with the Arm architecture. Prospectus at 96. According to Mr. Grisenthwaite, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

63. I discussed with Mr. Grisenthwaite the types of support that Arm provides to its customers. He noted that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(iii) Arm Processors

64. Arm also offers its customers a variety of Arm-developed processor products, including its Cortex CPUs, GPUs, Physical IP, System IP, Security IP, and Subsystems IP.¹⁰ When a core is compatible with Arm, it can interoperate with other Arm-developed products. For example, the Nuvia/Qualcomm NCCs and SoCs included cores that interoperated with

¹⁰ ARM, <https://www.arm.com/products> (last visited December 15, 2023).

other IP blocks from Arm. Thus, there is an ecosystem of Arm IP and tools from which those designing their own Arm cores can benefit. A company can license the Arm processor products and IP blocks under a Technology License Agreement (“TLA”). Prospectus at 96. Under a TLA, customers are provided with “off-the-shelf” Arm CPUs and IP blocks that are compliant with the Arm architecture.

65. Arm’s Cortex CPUs include the Cortex-A, Cortex-R, and Cortex-M families. The Cortex-A processors are CPUs for general use with operating systems and third-party applications.¹¹ The Cortex-R processors are embedded processors for real-time digital signal processing and control.¹² The Cortex-M processors are microcontrollers.¹³

66. Arm’s processors are used for many different applications in different markets, including consumer technologies (*e.g.*, personal computers, smartphones, tablets),¹⁴ automotive,¹⁵ cloud computing,¹⁶ and Internet of Things (IoT).¹⁷

¹¹ ARM, <https://www.arm.com/product-filter?families=cortex-a&showall=true> (last visited December 15, 2023).

¹² ARM, <https://www.arm.com/products/silicon-ip-cpu?families=cortex-r> (last visited December 15, 2023).

¹³ ARM, <https://www.arm.com/products/silicon-ip-cpu?families=cortex-m&showall=true> (last visited December 15, 2023).

¹⁴ ARM, <https://www.arm.com/markets/consumer-technologies> (last visited December 15, 2023).

¹⁵ ARM, <https://www.arm.com/markets/automotive> (last visited December 15, 2023).

¹⁶ ARM, <https://www.arm.com/markets/computing-infrastructure> (last visited December 15, 2023).

¹⁷ ARM, <https://www.arm.com/markets/iot> (last visited December 15, 2023).

**(iv) Arm Has a Large Patent Portfolio
Covering Its Architectural
Innovations**

67. One of the ways Arm protects its proprietary technology is by seeking patent protection for its innovations. Prospectus at 148. As of March 31, 2023, Arm owns or co-owns approximately 6,800 issued patents and has approximately 2,700 pending patent applications worldwide. (*Id.*) The patents cover aspects of Arm's processor architecture and microarchitecture, including certain specific instructions. (*Id.*) By patenting its technology, Arm retains IP rights in the Arm architecture that it licenses to its customers, even while making the Arm ARM available to the public.

68. I spoke with Mr. Grisenthwaite regarding Arm's patent portfolio. He confirmed that Arm's patents cover aspects of the Arm architecture, including memory management for 64-bit addresses, memory stack protection, and circuits for efficient conditional execution of certain instructions.¹⁸

**(v) Industry Adoption of Arm
Architectures**

69. Arm-based CPUs are the most popular and pervasive CPUs in history. Prospectus at 12. As I mentioned above, ARM-based CPUs are in 99% of the world's smartphones and Arm estimates that 70% of the world's population uses Arm-based products. Prospectus at 11. More than

¹⁸ By way of example, Mr. Grisenthwaite identified the following U.S. patents that describe features in the Armv8 architecture: Nos. 9,753,724; 9,760,374; and 8,566,563.

260 companies report that they shipped Arm-based chips in the fiscal year ending on March 31, 2023, including the world's largest companies like Amazon, Google, AMD, Intel, MediaTek, NVIDIA, and Samsung. (*Id.*) The Arm architecture and Arm-based CPUs have been adopted throughout the industry.

2. Qualcomm

70. Qualcomm is a technology company whose primary focus is on developing and commercializing technology for mobile devices and other wireless products.¹⁹ Qualcomm principally derives revenue from sales of its integrated circuit products, including its Snapdragon family of products, and licensing of its intellectual property. Qualcomm Annual Report at 8. Around 2017, Qualcomm sought to develop a custom Arm-based CPU for data centers. Qualcomm called the custom core “Falkor” and the related SoC “Centriq.”²⁰ This effort was not ongoing at the time of the Nuvia acquisition, since the president of Qualcomm’s data center business unit had left and the media reported that Qualcomm planned to offload the division.²¹ [REDACTED]

[REDACTED]

¹⁹ Qualcomm, Annual Report (Form 10-K) (September 26, 2021), <https://www.sec.gov/Archives/edgar/data/804328/000172894921000076/qcom-20210926.htm> (last visited December 15, 2023) (hereafter Qualcomm Annual Report).

²⁰ *Introducing the Qualcomm Falkor CPU core: purpose-built for cloud workloads*, QUALCOMM, OnQ Blog (August 19, 2017), <https://www.qualcomm.com/news/onq/2017/08/introducing-qualcomm-falkor-cpu-core-purpose-built-cloud-workloads> (last visited December 15, 2023).

²¹ James Morra, *With Future Uncertain, Qualcomm Loses Data Center President*, ELECTRICDESIGN (May 22, 2018), <https://www.electronicdesign.com/markets/automation/article/21806539/with-future-uncertain-qualcomm-loses-data-center-president> (last visited December 15, 2023).

[REDACTED]

[REDACTED]

[REDACTED]

QCARM_3520804.)

3. Nuvia

a. Company Background

71. Nuvia was founded as a start-up in 2019 by ex-Apple engineers Gerard Williams III, Manu Gulati, and John Bruno.²² Mr. Williams was previously an ARM fellow at Arm for twelve years ([REDACTED]) and was also the Chief Architect at Apple for the M1 processor, which was a custom Arm-compliant CPU for consumer devices like laptops. ([REDACTED] [REDACTED] [REDACTED]) Nuvia planned to design energy-efficient

²² Danny Crichton, *Three of Apple and Google's former star chip designers launch NUVIA with \$53M in series A funding*, TECHCRUNCH (November 15, 2019), <https://techcrunch.com/2019/11/15/three-of-apple-and-googles-former-star-chip-designers-launch-nuvia-with-53m-in-series-a-funding/> (last visited December 15, 2023).

CPUs for data center servers based on the Arm architecture.²³ At the time, designing a processor for data centers would have expanded the market for Arm's technology, since the data center market was historically dominated by x86 architectures. () Nuvia named its custom Arm-based CPU core " ()

b. Nuvia's ALA and TLA

(i) Background of Nuvia's ALA and TLA

72. On September 26, 2019, Arm and Nuvia entered into both an ALA (ARM_00059183) and a TLA (ARM_00002988). On September 27, 2019, Arm and Nuvia entered into an Annex 1 for both the ALA (QCARM_0339310) and the TLA (ARM_00051126). On March 27, 2020, Arm and Nuvia entered into another Annex 1 for both the ALA (ARM_00057230) and the TLA (QCARM_3861394).

73. As I explained in § III.B.1.ii, above, ALAs generally provide the licensee with the right to develop and produce a custom core that is compliant with the Arm architecture.

74. I am not an expert on licensing, but I have reviewed the Nuvia ALA agreement (including both Annex 1 documents). As I understand it, the Arm-Nuvia ALA agreement gave Nuvia the right to design and market a custom Arm-compliant core under that agreement. The Arm-Nuvia ALA

²³ Dean Takahashi, *Nuvia raises \$240 million to design Arm-based CPUs for datacenters*, VENTUREBEAT (September 24, 2020), <https://venturebeat.com/business/nuvia-raises-240-million-to-design-arm-based-cpus-for-datacenters/> (last visited December 15, 2023).

agreement provided Nuvia with access to a [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(ii) Definition of [REDACTED]

75. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

76. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(ARM_00057230 at -231.)

77. According to my understanding from reviewing the documents,

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

As Mr. Grisenthwaite explained in his deposition, the ALA [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

78. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

79.

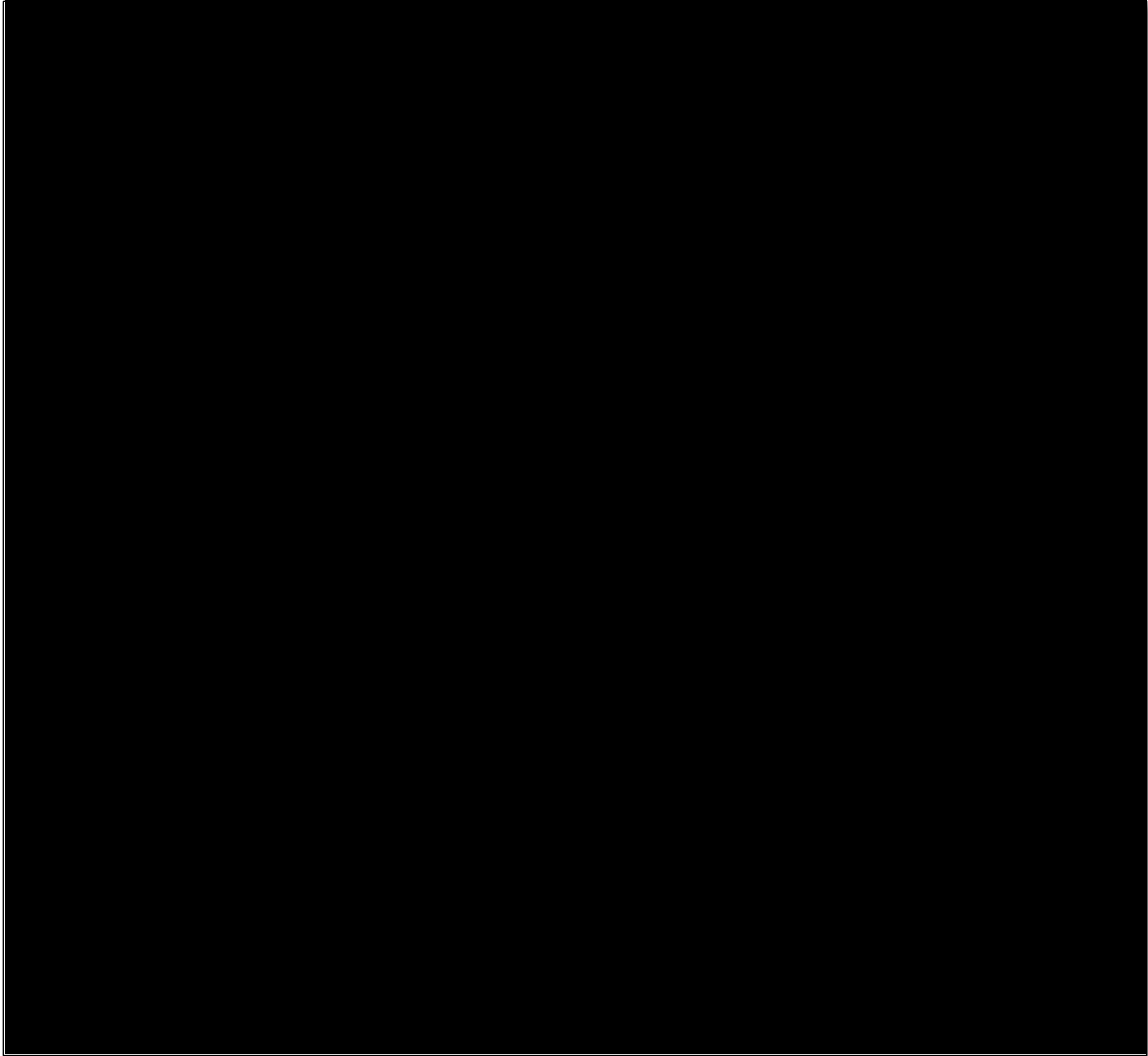
[REDACTED]

[REDACTED]

[REDACTED]

(ARM_00057230 at -231.)

80. The “ARMv8-A Architecture Compliance Kit” (ACK), product code AR115, includes, among other things, a compliance kit, validation suite, and a trace checker module:



(ARM_00057230 at -231-232.)

81.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. Arm's Richard Grisenthwaite told me [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(ARM_00057230 at -232.)

83. Computer security has become an essential element of modern systems, particularly systems through which valuable information flows (such as credit card numbers or bank account data). These systems, including smartphones, are actively and routinely attacked, so in response, these information flows must be encrypted by the sender and decrypted by the receiver. Encryption and decryption algorithms are computationally quite intensive, yet must be performed quickly enough that system users do not become impatient. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(iii)

[REDACTED]

84.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

85. At every step of CPU development, hundreds of decisions are made that balance the various project goals against the fixed requirements of the ISA. Nearly every aspect of the RTL implicitly reflects the influences of the [REDACTED]

[REDACTED]. Arm

also provides [REDACTED]

[REDACTED]

[REDACTED]

86. My understanding is consistent with that of Mr. Grisenthwaite, who told me that [REDACTED]

Similarly, I consider

24

87. Likewise, if a licensee has chosen to implement [REDACTED] [REDACTED] obviously the instruction decoder design will necessarily reflect that, since it has to detect and decode all CPU instructions. Beyond that, however, inclusion of [REDACTED] will impact the microarchitecture in several distinct ways that are unique to Arm-compliant CPUs: a [REDACTED]

²⁴ As I mentioned in § III.B.3.b.iv below, the termination provision of the Nuvia ALA states:

(iv) Termination Provision

88. From my review of the documents, it is my understanding that [REDACTED] of the Nuvia ALA discusses Nuvia's obligations if Arm terminates the ALA. (ARM_00059183 at -196.) This section references the [REDACTED] [REDACTED] definition, which I previously discussed:

[REDACTED]

(Id.)

89. From my review, I understand that [REDACTED] requires that upon termination of the ALA by Arm, Nuvia is required to [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] As I

explained in § III.B.3.b.iii, above, my understanding as a technical and

industry expert is that [REDACTED] include [REDACTED]

[REDACTED]
[REDACTED]

C. Factual Background

1. Nuvia Develops the [REDACTED] in Compliance with the Arm Architecture

90. Nuvia developed an SoC codenamed “[REDACTED]” that was designed for the data center market. (QCARM_2402257 at -263.) [REDACTED] included a custom CPU core called “[REDACTED] ([REDACTED])”

[REDACTED]
[REDACTED]

[REDACTED]

(QCARM_2402257 at -269.)

[REDACTED]

(QCARM_2402257 at -270.)

[REDACTED]

(QCARM_2402257 at -318.)

91. Nuvia designed the [REDACTED] core in accordance with the Armv8-A architecture described in the Arm ARM. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] (See

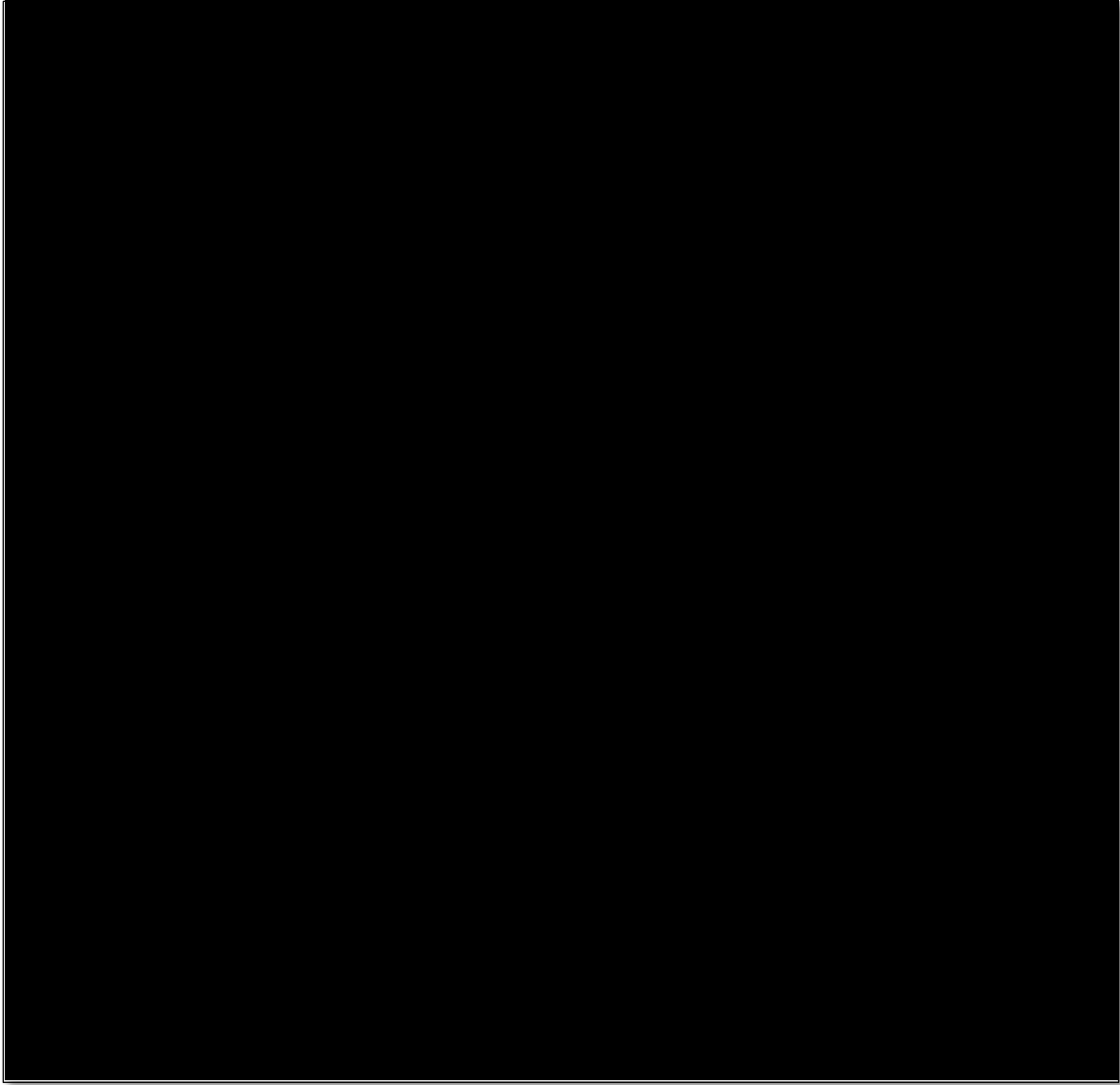
QCARM_3087757, QCARM_3087992, QCARM_0325086, QCARM_0490031, QCARM_3088245, QCARM_3089361, QCARM_3087396, QCARM_3088553, QCARM_0325371, QCARM_0490329, QCARM_3088937.)

92. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



(QCARM_3087757 (highlighting added).)

93.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

94. [REDACTED]

95. [REDACTED]

2. Qualcomm Purchases Nuvia and Arm Objects

96. As I explained in § III.B.1.i, above, Arm established dominance in the mobile processor market in the 1990s and Arm remains recognized as the premier CPU provider for the mobile processor market.²⁵ Arm technology was in 90% of smartphones as far back as 2010, and its market share of the

²⁵ William Gayde, *How Arm Came to Dominate the Mobile Market*, TECHSPOT (December 24, 2020), <https://www.techspot.com/article/1989-arm-inside/> (last visited December 15, 2023).

mobile processor market has only grown since then, with Arm “dominat[ing] the mobile processor market with almost every major release built on top of its architecture.” (*Id.*)

97. Arm licensee Apple launched its M1 SoC on November 10, 2020,²⁶ designed for personal computers. The M1 SoC uses a custom Arm processor as opposed to an x86 processor from Intel.²⁷ The M1 was an instant hit, as it was touted as being more efficient, operating faster, and having a longer battery life than competing SoCs, all with the use of a custom Arm processor. (*Id.*)

98. The release of the M1 SoC catapulted Arm into the PC market, as the M1 SoC was quickly recognized as outperforming other SoCs on the market.²⁸ The Apple M1 has since been viewed as a game changer in the CPU processor world and has helped Apple capture over 21% of the global PC

²⁶ APPLE, Press Release: Apple unleashes M1 (November 10, 2020), <https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/> (last visited December 15, 2023).

²⁷ Nermin Hajdarbegović, *Apple M1 Processor Overview and Compatibility*, TOPTAL, <https://www.toptal.com/apple/apple-m1-processor-compatibility-overview> (last visited December 15, 2023).

²⁸ Stephen Shankland, *Apple M1 Macs are kick-starting a new Arm-based PC era. Arm's CEO is optimistic*, CNET (January 13, 2021), <https://www.cnet.com/tech/computing/apple-m1-macs-are-kick-starting-new-arm-based-pc-era-arm-ceo-is-optimistic/> (last visited December 15, 2023).

market.²⁹ With the expansion into the PC market, Arm is now recognized as a major player in designing CPU chips used in PCs.³⁰

99. Following the rise of Apple's M1 chip, Qualcomm considered purchasing Nuvia, which was developing its own Arm-based custom CPU core. [REDACTED]

[REDACTED]

[REDACTED]



(QCARM_3536689.)

²⁹ Urvish Mahajan, *Apple M1 — How Apple Silicon Changed the PC Industry*, MEDIUM (September 23, 2023), <https://medium.com/@urvishmahajan/apple-m1-how-apple-changed-the-pc-industry-4a7c3c8a3d57#:~:text=The%20M1%20chip%20powered%20MacBook,Window's%20growth%20was%20just%206%25> (last visited December 15, 2023).

³⁰ Katie Tarasov, *How Arm is gaining chip dominance with its architecture in Apple, Nvidia, AMD, Amazon, Qualcomm and more*, CNBC (November 9, 2023), <https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html> (last visited December 15, 2023).

100.

[REDACTED]

[REDACTED]

(QCARM_3536628.)

101.

[REDACTED]

[REDACTED]

[REDACTED]

102. On January 13, 2021, Qualcomm announced that Qualcomm Technologies, Inc. was acquiring Nuvia for \$1.4 billion. (QCARM_2423540.)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

103. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

104.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

105.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

106.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Qualcomm has represented to the media that “the creation of our custom CPU was started by Nuvia engineers while employed at Nuvia.”³¹

107. On March 1, 2022, the Nuvia licenses terminated, along with the corresponding rights to use or sell products based on or incorporating Nuvia technology developed under those licenses. (QCARM_0338883.)

108. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3. Qualcomm Incorporates Nuvia Cores Into Its Own Products

109. After acquiring Nuvia, Qualcomm incorporated Nuvia's work on the [REDACTED] core into Qualcomm's own products. [REDACTED]

[REDACTED]

[REDACTED]

³¹ Mark Hachman, *Qualcomm dubs Nuvia CPU 'Oryon,' on track for 2023*, PCWORLD (November 17, 2022), <https://www.pcwORLD.com/article/1382740/qualcomm-dubs-nuvia-cpu-oryon-on-track-for-2023.html> (last visited December 16, 2023).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] I would expect that Qualcomm used Nuvia’s pre-acquisition work on the [REDACTED] core to further develop the [REDACTED] core that was submitted to Arm for verification. Consistent with my expectations, Qualcomm representatives have been quoted in the press as saying that “the creation of our custom CPU was started by Nuvia engineers while employed at Nuvia.”³² Also, as described below, Dr. Chen’s analysis of the RTL code for the [REDACTED] cores establishes that a significant portion of the [REDACTED] RTL code developed at Nuvia was incorporated into the later versions of the [REDACTED] core developed by Qualcomm.

110. [REDACTED]

[REDACTED]

[REDACTED]

³² Mark Hachman, *Qualcomm dubs Nuvia CPU ‘Oryon,’ on track for 2023*, PCWORLD (November 17, 2022), <https://www.peworld.com/article/1382740/qualcomm-dubs-nuvia-cpu-oryon-on-track-for-2023.html> (last visited December 16, 2023).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

111.

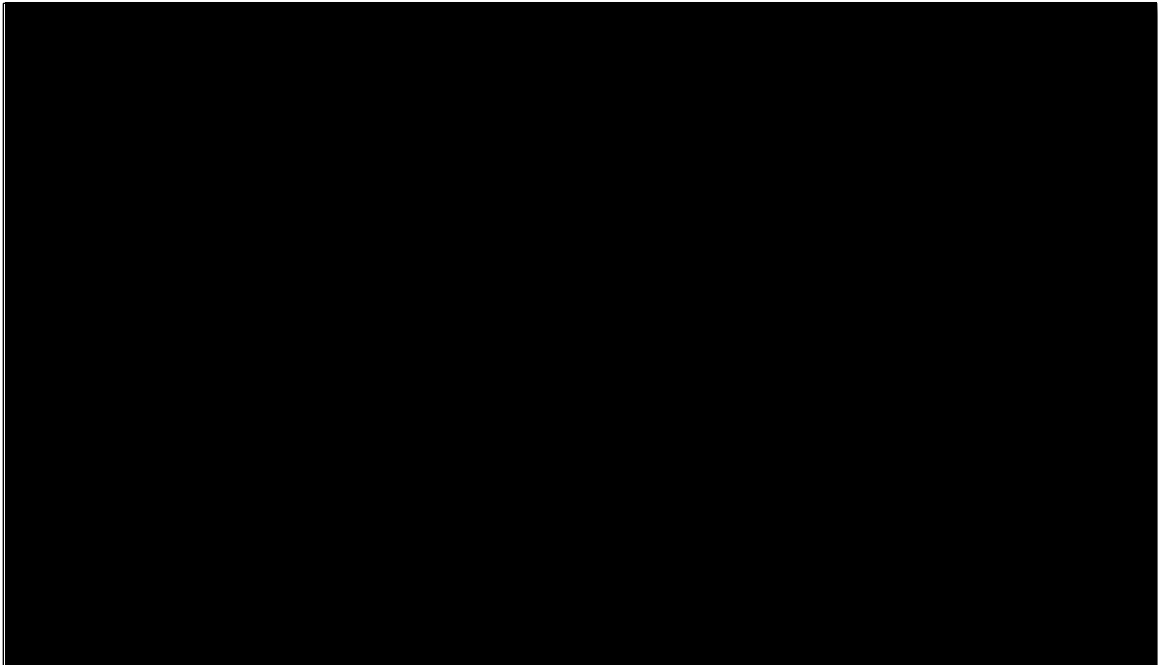
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



(QCARM_0181949 at -950.)

112.

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]



(QCARM_0182011 at -019.)

113.

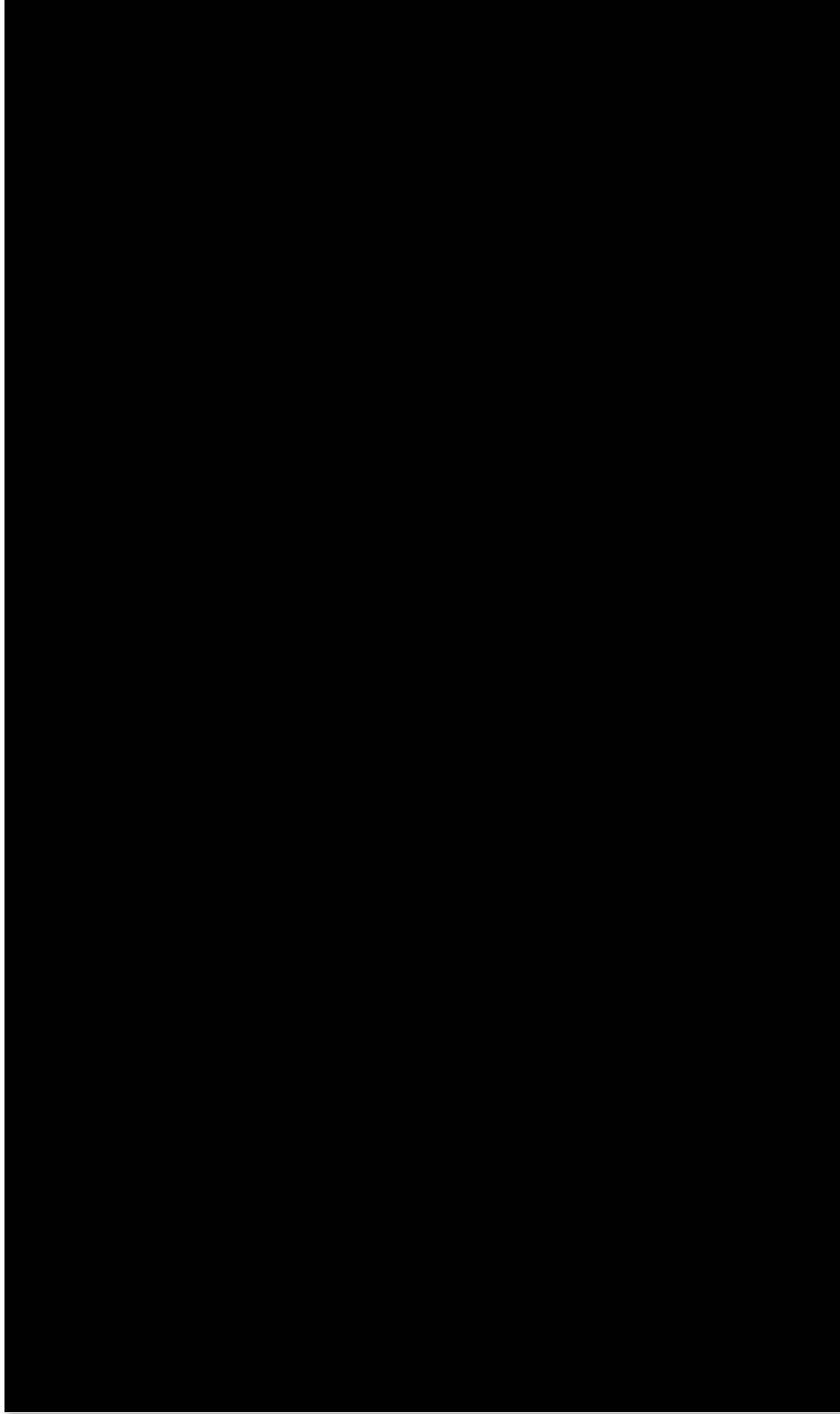
[REDACTED]

[REDACTED]

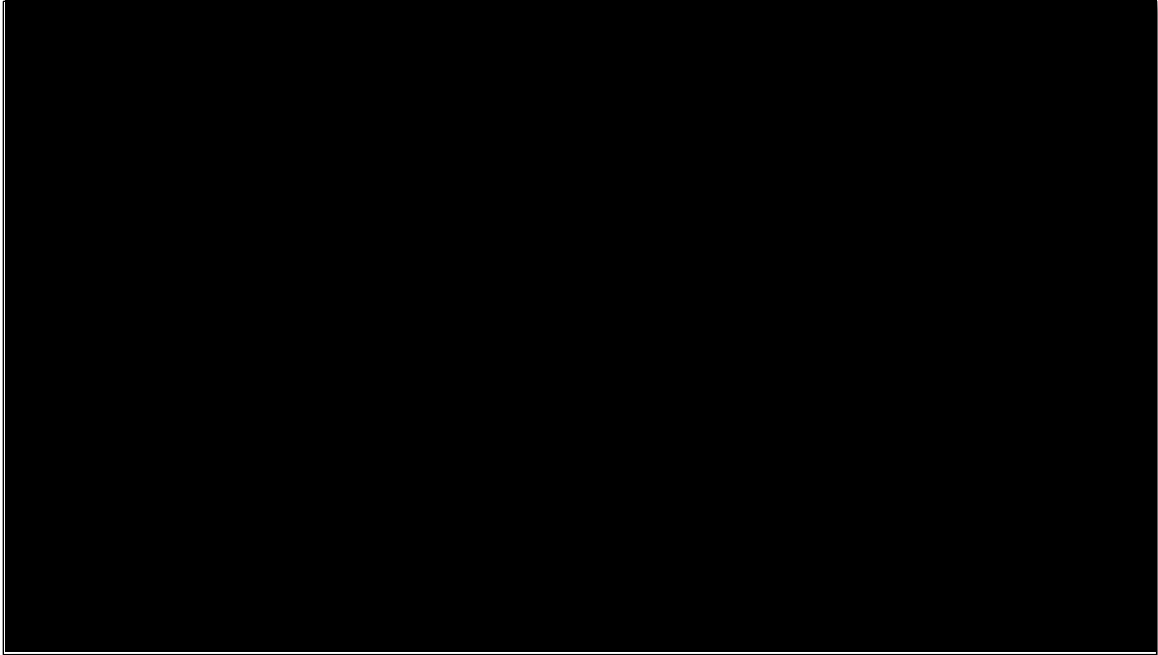
[REDACTED]

[REDACTED]

[REDACTED]



(QCARM_0169739 at -744 (cropped for visibility).)



(QCARM_0169739 at -749.)

114.



(QCARM_0550518 at -521.)

4. Qualcomm Releases Snapdragon X

115. On October 24, 2023, Qualcomm announced its new Snapdragon® X Elite platform of SoCs, with what it called its “custom integrated Qualcomm Oryon CPU.”³³ Qualcomm’s attorneys represented that they produced source code corresponding to Oryon: “Oryon is a brand name and does not refer to a specific project or piece of technology. Qualcomm has produced source code for the custom CPUs that will be sold under the Oryon name.” (10/26/2023 email from J. Braly to J. Li.) Based on these representations and the dates of the produced source code (*see* § IV.B, below), it is my understanding that the October 24, 2023 [REDACTED] [REDACTED] code corresponds to the Qualcomm Oryon CPU announced on the same date, making the Snapdragon® X Elite platform of SoCs and Qualcomm Oryon CPU [REDACTED] [REDACTED]

5. Abbreviated Timeline of Events

116. Below is an abridged timeline of events for this case.

Date	Event
Feb. 2019	Gerard Williams III, John Bruno, and Manu Gulati found Nuvia. ³⁴

³³ QUALCOMM, Press Note: Qualcomm Unleashes Snapdragon X Elite: The AI Super-Charged Platform to Revolutionize the PC (Oct. 24, 2023), <https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat> (last visited December 16, 2023).

³⁴ Dean Takahashi, *Nuvia raises \$240 million to design Arm-based CPUs for datacenters*, VENTUREBEAT (Sept. 24, 2020), <https://venturebeat.com/business/nuvia-raises-240-million-to-design-arm-based-cpus-for-datacenters/> (last visited December 15, 2023).

Sep. 27, 2019	Arm and Nuvia enter into the Architecture License Agreement (ALA) and the Technology License Agreement (TLA). ³⁵
Aug. 11, 2020	Nuvia announces the [REDACTED] core. ³⁶
Mar. 16, 2021	Qualcomm completes acquisition of Nuvia. ³⁷
Feb. 1, 2022	Arm notifies Nuvia that it intends to terminate the ALA and the TLA due to Nuvia's violation of the assignment provisions. The termination is to be effective as of Mar. 1, 2022. ³⁸
[REDACTED]	[REDACTED]
Mar. 1, 2022	Effective date of termination of Nuvia ALA and TLA. ⁴⁰
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
Aug. 31, 2022	Arm files a complaint against Qualcomm and Nuvia for breach of contract and trademark infringement in the U.S. District Court for the District of Delaware. ⁴³

³⁵ (QCARM_0337839; QCARM_0338297.)

³⁶ Matthew Connaster, *Nuvia Announces CPI Codenamed [REDACTED] Promises to Deliver Leading Single Threaded Performance*, ADORED TV (August 11, 2020), [https://adoredtv.com/nuvia-announces-cpu-codenamed-\[REDACTED\]-promises-to-deliver-leading-single-threaded-performance/](https://adoredtv.com/nuvia-announces-cpu-codenamed-[REDACTED]-promises-to-deliver-leading-single-threaded-performance/) (last visited December 20, 2023).

³⁷ (QCARM_2402586.)

³⁸ (QCARM_0338883.)

³⁹ (QCARM_0557206.)

⁴⁰ (QCARM_0338883.)

⁴¹ (QCARM_3433989.)

⁴² (QCARM_0190735.)

⁴³ (ARM_00045395.)

IV. FURTHER OPINIONS⁴⁴

A. The [REDACTED] Cores Were Designed as [REDACTED]
[REDACTED] and Are [REDACTED]

1. Relevant Technical Definitions from Nuvia
ALA and Annex.

117. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

118. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

119. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁴⁴ In addition to my opinions set forth in § IV, I note that I have provided some opinions in the Background (§ III). I incorporate any opinions from the Background (§ III) into the Opinion (§ IV).

120.

[REDACTED]

121.

[REDACTED]

[REDACTED]

[REDACTED]

(*Id.*)

122. [REDACTED]

[REDACTED]

123. [REDACTED]

[REDACTED]

2. The Nuvia [REDACTED] Core and Later Versions of the [REDACTED] Core Were Designed to Implement the Elements of the Armv8 Architecture.

a. Nuvia decided to create a custom core based on the Arm architecture.

124. Since its founding, Nuvia's vision was to create an enterprise-level data server processor using the Armv8 architecture.

(QCARM_3314892 at -893, -905.) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

125. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

b.

[REDACTED]

(i)

[REDACTED]

126.

--	--

--	--

(ii)

[REDACTED]

127.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(*Id.* at -772-773.)

128. [REDACTED]

[REDACTED]

129. [REDACTED]

[REDACTED]

[REDACTED]	Phoenix Cores ⁴⁶
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] ⁴⁹

⁴⁵ Requirements listed in Nuvia Annex [REDACTED]

⁴⁶ [REDACTED]

⁴⁷ *Id.* at -772.

⁴⁸ *Id.* at -972.

⁴⁹ *Id.* at -772.

	0
	51
	55

130.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵⁰ *Id.* at -813.

⁵¹ *Id.* at -922.

⁵² *Id.* at -773.

⁵³ “The Armv8 A-profile architecture includes a *Virtual Memory System Architecture* (VMSA).” Arm Architecture Reference Manual: Armv8, for A-profile architecture, D4.1.1 “Form of the memory system architecture.” (ARM_0132149 at -782.)

⁵⁴ (QCARM_3087757 at -922.)

⁵⁵ *Id.* at -773.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

131. As the above shows, Nuvia developed the [REDACTED] core to ultimately be an [REDACTED]. As Mr. Grisenthwaite stated during our conversation, an Arm-compliant core is necessarily [REDACTED] [REDACTED] the Arm architecture. He maintained that one cannot produce an Arm-compliant core without understanding the Arm architecture, which requires consulting the Arm ARM to get every one of thousands of details right. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(iii) [REDACTED]

132. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

133. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]


[REDACTED]

[REDACTED]

134. [REDACTED]

[REDACTED]

[REDACTED]

Source	File Name	Date	Total Pages	 - Page Numbers
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source	File Name	Date	Total Pages	“Armv8 ISA support” – Page Numbers
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

- c. Nuvia utilized Arm materials to develop the [REDACTED] Core.
- (i) Nuvia used [REDACTED] as defined in the ALA Annex to build the [REDACTED] Core.

135. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] I understand that Nuvia downloaded these documents and tools either online or through [REDACTED]

[REDACTED] and used

them during the development process for the [REDACTED] core. (*See e.g.*,

ARM_00002045 (showing that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

136. [REDACTED]

[REDACTED]

[REDACTED] As summarized by Mr. Grisenthwaite during
our conversation, [REDACTED]

[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

137. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] I further discuss
these verification tools and Nuvia's use of them below in § IV.A.3.a.

138. [REDACTED]

[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Nuvia downloaded elements of the

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(ii) Nuvia also used other Arm documents, tools, and knowledge to build the [REDACTED] Core.

139. In addition to the [REDACTED] defined in the ALA Annex, Nuvia also used other Arm materials to develop [REDACTED] According to

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Most of these files were downloaded in 2019 and 2020, prior to Qualcomm's acquisition of Nuvia. (*See id.*) For example, Mr. Trivedi

downloaded [REDACTED]

[REDACTED]. (*Id.*; [REDACTED]

[REDACTED]) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Nuvia engineers Vinod Chamarty and Geeta Balakrishnan downloaded hundreds of Arm documents and tools while at Nuvia in 2019 and 2020. (*See* ARM_00002045.)

140. Aside from distinct Arm materials and tools, Nuvia also obtained Arm support and knowledge to develop the [REDACTED] core. (*See, e.g.*, ARM_00040395; ARM_00038935.) During my conversation with Mr. Grisenthwaite, he mentioned that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In 2020 and 2021, Nuvia/Qualcomm and Arm personnel

[REDACTED]

[REDACTED]

- d. Nuvia and Qualcomm employees testified that the [REDACTED] Cores were designed to implement Armv8 Architecture and be Arm-compliant.

141. [REDACTED]

[REDACTED]

[REDACTED]

142. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

143. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

144.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

145.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

146.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

147.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

148.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3. The Nuvia [REDACTED] Core Was Validated as an [REDACTED].

- a. Nuvia and Qualcomm used confidential Arm tools to verify the Nuvia [REDACTED] Core's compliance with Armv8 Architecture.**

149. In designing the Nuvia [REDACTED] core to be an Arm-compliant core, Nuvia had access to and utilized confidential Arm tools. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED]

150. The [REDACTED], is [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

151. The [REDACTED] is [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

152. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

153. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

b. Arm validated the Nuvia [REDACTED]
Core as an Arm

[REDACTED]

154. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

155.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

B. Nuvia's Design of the [REDACTED] Core Is Incorporated into Several of Qualcomm's SoC Products.

156. As I explained in §§ III.C.1 and IV.A above, Nuvia worked on designing and developing a custom Arm CPU core called [REDACTED] which Nuvia worked to incorporate into an SoC called [REDACTED]. As I also explained in § III.C.3, after Qualcomm acquired Nuvia, Qualcomm incorporated the Nuvia [REDACTED] core into several of its SoCs, including the [REDACTED] [REDACTED] SoCs. This is confirmed by the RTL code analysis described below.

157. I understand based on information from Qualcomm's attorneys (*see* 9/12/2023 email from J. Braly to F. Patel) and my own review of the RTL code that Qualcomm has produced the following RTL code in this litigation:

- [REDACTED] NCC
 - March 14, 2021
 - February 28, 2022
 - April 1, 2022
 - October 24, 2022
- [REDACTED] NCC
 - July 30, 2021
 - April 13, 2023
 - October 24, 2023
- [REDACTED] NCC

- January 11, 2022
- July 28, 2023
- [REDACTED] NCC
 - February 21, 2023
 - July 28, 2023
- [REDACTED] NCC
 - July 28, 2023

158. Based on my review, I understand that the RTL code produced for “[REDACTED] NCC,” “[REDACTED] NCC,” “[REDACTED] NCC,” and “[REDACTED] NCC” includes code for versions of the [REDACTED] core incorporated into each of those SoCs. I understand that the RTL code produced for “[REDACTED] NCC” includes code for a CPU core called “[REDACTED]” that is designed [REDACTED]

[REDACTED]

159. I note that the March 14, 2021 [REDACTED] NCC code is dated one day before the March 15, 2021 Qualcomm acquisition of Nuvia. Based on these dates, I understand that the March 14, 2021 [REDACTED] NCC code is RTL code that Nuvia prepared and that Qualcomm acquired as part of its purchase of Nuvia.

160. I understand that Arm asked Dr. Mike Chen to review the RTL source code produced by Qualcomm and prepare an expert report describing his analysis. Dr. Chen is a professor in the School of Electrical and Computer Engineering at the University of Southern California and has a Ph.D. in Electrical Engineering from the University of California at Berkeley.

161. I have reviewed Dr. Chen's expert report. In addition, on December 15 from approximately 9 a.m. to 4:30 p.m., I reviewed the source code produced by Qualcomm on the source code desktop, together with Dr. Chen. During that meeting, Dr. Chen showed me the source code produced by Qualcomm, explained the analysis that he performed, and described his findings.

162. As explained in § II, I am an expert in computer engineering and microprocessor design due to, among other things, my time as Chief Architect of the x86 at Intel. I have extensive experience writing and interpreting RTL. Based on my experience, my review of Dr. Chen's report, my discussions with Dr. Chen, and my own review of the RTL source code, I endorse the qualitative and quantitative conclusions from Dr. Chen's expert report, namely that: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

163. Specifically, I endorse and share Dr. Chen's conclusion that the

[REDACTED]

[REDACTED]

As Dr. Chen notes in his report, and consistent with my review of

[REDACTED]

As Dr. Chen's report shows, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

164. I endorse and share Dr. Chen's conclusions that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Using file comparison tools, Dr. Chen was able to show the percentage of [REDACTED] lines of code that precisely matched those in the Nuvia [REDACTED] design. If only a relatively few lines of code were found to have been "reused" from the earlier [REDACTED] RTL, then further investigation would have had to be performed

before concluding that the later designs were the same core as the earlier ones. [REDACTED]

[REDACTED]

165. Dr. Chen also collected data comparing the Nuvia [REDACTED] database to [REDACTED] and [REDACTED] which [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

166. Thus, in view of Dr. Chen's report and my own scrutiny of the RTL code, it is my opinion that the March 14, 2021, Nuvia [REDACTED] code is

[REDACTED]

[REDACTED] Nuvia and Qualcomm designs

after the March 14, 2021, Nuvia [REDACTED] code are also [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

167. In view of Dr. Chen's report and my own code review, it is also my opinion that the March 14, 2021, [REDACTED] code is also [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

C. Qualcomm's Purported Swap Out [REDACTED]

1. Qualcomm's Swap Out Was in Response to Termination of the Nuvia Agreements

168. As discussed in § IV(A), the Nuvia [REDACTED] core was designed to be an [REDACTED]. I understand that, following Arm's termination of the Nuvia ALA and TLA on March 1, 2022, Qualcomm made efforts [REDACTED]

[REDACTED] I refer to this exercise as the "Swap Out," consistent with Qualcomm's terminology. ([REDACTED]

[REDACTED]) I have reviewed Qualcomm's responses to Arm's Interrogatory No. 5 in which Qualcomm describes the actions it undertook as part of the Swap Out.

169. I understand that when Arm terminated the Nuvia ALA and TLA, Arm asked Nuvia to [REDACTED]

[REDACTED] I understand that this language is based on [REDACTED] of the Nuvia ALA and TLA.

(ARM_00059183; ARM_00002988.) By its request, Arm was asking Nuvia to:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

170. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

171. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

2. **The Swap Out** [REDACTED]
[REDACTED]

172. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED]

173.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

174.

[REDACTED]

[REDACTED]

[REDACTED]

175.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

176. [REDACTED]

[REDACTED]

[REDACTED]

**3. Qualcomm Did Not Discontinue Using the
[REDACTED] Cores in [REDACTED]
[REDACTED] Following the Termination of
the Nuvia Licenses**

177. Qualcomm states that it performed the Swap Out to “comply with the termination provisions in Nuvia’s license agreements” (ECF No. 18 at ¶ 231), but the Swap Out [REDACTED]

[REDACTED]

[REDACTED]

178. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

179. As discussed in § IV.A above, the Nuvia [REDACTED] core was developed as an [REDACTED] based on information in the ARMv8-A Architecture Documentation Set (the Arm ARM) and other [REDACTED] materials supplied to Nuvia under the Nuvia ALA.

180. [REDACTED]

[REDACTED]

[REDACTED] Nuvia employees received this information.

For example, a download log shows that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Transaction ID		Part ID		ALA Annex Part	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]		[REDACTED]		[REDACTED]
	[REDACTED]		[REDACTED]		[REDACTED]
	[REDACTED]		[REDACTED]		[REDACTED]
	[REDACTED]		[REDACTED]		[REDACTED]

56 [REDACTED]

The diagram consists of three vertical columns of colored squares. Each column has 10 squares. The colors of the squares in each column are as follows:

- Left Column: Black, White, Blue, White, Blue, White, Blue, White, Blue, White.
- Middle Column: Black, White, Blue, White, Blue, White, Blue, White, Blue, White.
- Right Column: Black, White, Blue, White, Blue, White, Blue, White, Blue, White.

181.

182.

V. CONCLUSION

183. My opinions above are based on available information to date. I reserve the right to supplement or amend my opinions in this report, and also

to rebut opinions by Qualcomm's experts with which I disagree. I also reserve the right to correct any clerical errors that I discover after service of this report.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on this 20th day of December of 2023 in Portland, Oregon.

By: 

Dr. Robert P. Colwell

APPENDIX A
LIST OF MATERIALS CONSIDERED

All documents cited within this report.

Technical Expert Report of Dr. Michael Chen.

Qualcomm Source Code computer.

Correspondence dated 10/26/2023, email from J. Braly to J. Li.

Correspondence dated 9/12/2023, email from J. Braly to F. Patel.

PLEADINGS

Arm Ltd. v. Qualcomm Inc. et al., No. 1-22-cv-001146 MN (D. Del.):

ECF No. 1, Complaint, dated August 31, 2022.

ECF No. 12, SEALED Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim, dated September 30, 2022.

ECF No. 18, SEALED Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim, dated October 26, 2022.

ECF No. 23, SEALED Plaintiff Arm Ltd.'s Answer and Affirmative Defenses to Defendants Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc.'s Amended Counterclaim, dated November 15, 2022.

DISCOVERY

Defendants' Response and Objections to Plaintiff's First Set of Interrogatories (Nos. 1-13), dated February 27, 2023.

DEPOSITION TRANSCRIPTS REVIEWED⁵⁷

Gulati Deposition Transcript dated October 12, 2023.

Amon Deposition Transcript dated November 15, 2023.

Trivedi Deposition Transcript dated October 25, 2023.

Williams Deposition Transcript dated November 3, 2023.

Asghar Deposition Transcript dated November 8, 2023.

Grisenthwaite Deposition Transcript dated November 15, 2023.

Bos Deposition Transcript dated November 29, 2023.

Thompson Deposition Transcript dated November 28, 2023.

Sharma Deposition Transcript dated October 27, 2023.

Kanopathipillai Deposition Transcript dated December 1, 2023.

PRODUCED MATERIALS

ARM_01324149

ARM_00051126

QCARM_3087757

ARM_00059183

ARM_00057230

QCARM_3087992

ARM_00002988

QCARM_3861394

QCARM_0325086

QCARM_0339310

QCARM_2402257

QCARM_0490031

⁵⁷ I had all deposition transcripts available to me.

QCARM_3088245	QCARM_7403869	ARM_00002516
QCARM_3089361	QCARM_3535060	ARM_00042794
QCARM_3087396	QCARM_3534786	ARM_00038568
QCARM_3088553	QCARM_0338883	ARM_01309676
QCARM_0325371	QCARM_0557206	QCARM_0000864
QCARM_0490329	QCARM_3433989	QCARM_2540979
QCARM_3088937	QCARM_2402586	QCARM_2414840
QCARM_3536689	QCARM_0190735	ARM_00039434
QCARM_3536628	QCARM_3041647	ARM_00001456
QCARM_2423540	ARM_01216002	ARM_00099622
QCARM_3443782	ARM_01230173	QCARM_0337839
QCARM_0027987	QCARM_0181949	QCARM_0338297
QCARM_0339647	QCARM_0182011	ARM_00045395
QCARM_0339935	QCARM_0169739	ARM_00002654
QCARM_0339630	QCARM_0550518	QCARM_3520804
QCARM_3451883	QCARM_3314892	
QCARM_3972047	QCARM_0002581	
QCARM_3535531	ARM_00002045	
QCARM_3535726	ARM_00040395	
QCARM_3535496	ARM_00038935	

PUBLICLY AVAILABLE SOURCES

US Patent No. 9,753,724

US Patent No. 9,760,374

US Patent No. 8,566,563

Gavin Divers, Gaming Industry Dominates as the Highest-Grossing Entertainment Industry, GAMERHUB (Jan. 24, 2023), <https://gamerhub.co.uk/gaming-industry-dominates-as-the-highest-grossing-entertainment-industry/#:~:text=To%20put%20that%20in%20perspective,much%20as%20the%20movie%20industry> (last visited December 15, 2023).

Matthew Connatser, ARM vs. RISC-V: Is one better than the other? DIGITALTRENDS (May 31, 2022), <https://www.digitaltrends.com/computing/arm-vs-risc-v/> (last visited December 15, 2023).

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ARM, <https://www.arm.com/products/silicon-ip-cpu?families=cortex-r> (last visited December 15, 2023).

ARM, <https://www.arm.com/products/silicon-ip-cpu?families=cortex-m&showall=true> (last visited December 15, 2023).

ARM, <https://www.arm.com/markets/consumer-technologies> (last visited December 15, 2023).

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ELECTRICDESIGN (May 22, 2018),

<https://www.electronicdesign.com/markets/automation/article/21806539/with-future-uncertain-qualcomm-loses-data-center-president> (last visited December 15, 2023).

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<https://techcrunch.com/2019/11/15/three-of-apple-and-googles-former-star-chip-designers-launch-nuvia-with-53m-in-series-a-funding/> (last visited December 15, 2023).

Dean Takahashi, *Nuvia raises \$240 million to design Arm-based CPUs for datacenters*, VENTUREBEAT (Sept. 24, 2020), <https://venturebeat.com/business/nuvia-raises-240-million-to-design-arm-based-cpus-for-datacenters/> (last visited December 15, 2023).

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<https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/> (last visited December 15, 2023).

Nermin Hajdarbegović, *Apple M1 Processor Overview and Compatibility*, TOPTAL,

<https://www.toptal.com/apple/apple-m1-processor-compatibility-overview> (last visited December 15, 2023).

Stephen Shankland, *Apple M1 Macs are kick-starting a new Arm-based PC era. Arm's CEO is optimistic*, CNET (Jan. 13, 2021), <https://www.cnet.com/tech/computing/apple-m1-macs-are-kick-starting-new-arm-based-pc-era-arm-ceo-is-optimistic/> (last visited December 15, 2023).

Urvish Mahajan, *Apple M1 — How Apple Silicon Changed the PC Industry*, MEDIUM (Sep. 23, 2023), <https://medium.com/@urvishmahajan/apple-m1-how-apple-changed-the-pc-industry->

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[4a7c3c8a3d57#:~:text=The%20M1%20chip%20powered%20MacBook,Window's%20growth%20was%20just%206%25">4a7c3c8a3d57#:~:text=The%20M1%20chip%20powered%20MacBook,Window's%20growth%20was%20just%206%25](#) (last visited December 15, 2023).

Katie Tarasov, *How Arm is gaining chip dominance with its architecture in Apple, Nvidia, AMD, Amazon, Qualcomm and more*, CNBC (Nov. 9, 2023),

<https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html> (last visited December 15, 2023).

Mark Hachman, Qualcomm dubs Nuvia CPU 'Oryon,' on track for 2023, PCWORLD (Nov. 17, 2022), <https://www.pcworld.com/article/1382740/qualcomm-dubs-nuvia-cpu-oryon-on-track-for-2023.html> (last visited December 16, 2023).

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<https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat> (last visited December 16, 2023).

Hassan Mujtaba, *Apple M1 ARM 8 Core CPU Is Faster Than Intel & AMD's Fastest 8 Core Chips in Single-Core Performance Benchmark*, WCCFTECH (March 25, 2021),

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David Coffin et al., *The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry*, U.S. INTERNATIONAL TRADE COMMISSION (USITC) (June 2022),

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Matthew Connaster, *Nuvia Announces CPI Codenamed [REDACTED] Promises to Deliver Leading Single Threaded Performance*, ADORED TV (August 11, 2020),

[https://adoredtv.com/nuvia-announces-cpu-codenamed-\[REDACTED\]-promises-to-deliver-leading-single-threaded-performance/](https://adoredtv.com/nuvia-announces-cpu-codenamed-[REDACTED]-promises-to-deliver-leading-single-threaded-performance/) (last visited December 20, 2023).

Appendix B

ROBERT P. COLWELL

3594 NW BRONSON CREST LOOP
PORTLAND, OR 97229
503-629-9638
BOB.COLWELL@GMAIL.COM

PROFESSIONAL EXPERIENCE

- **Director**, Microsystems Technology Office, DARPA Arlington VA 2012-2014
- **Deputy Director**, Microsystems Technology Office, DARPA 2011-2012
Led office of 17 program managers, budget ~\$600M/yr, funding research on computer systems, nanophotonics, bioengineering, radar, comms, lasers, IR imaging, and much more.
- **Consultant**, Portland, OR 2001-2011, 2014 - present
General computer HW/SW consulting to industry and academia (Safeware, the University of Pittsburgh, Intel, Qualcomm, venture capital companies, many startups, expert witness engagements, Lawrence Berkeley National Lab, US DoD)
- Named an **Intel Fellow** (27 Fellows in Intel's employee population of ~80,000) in 1997; winner of 2005 **Eckert-Mauchly Award**, highest award in field of computer architecture, for "outstanding achievements in the design and implementation of industry-changing microarchitectures, and for significant contributions to the RISC/CISC architecture debate"; elected to **IEEE Fellow** and **the National Academy of Engineering** in 2006 (the highest recognition in field of engineering) for "contributions to turning novel computer architecture concepts into viable, cutting-edge commercial processors." Inducted into the **American Academy of Arts and Sciences**, 2012. Winner of **IEEE Bob Rau Award**, 2015.
- **Chief IA-32 Architect**, Intel Corporation, Hillsboro OR, 1992-2001
Lead IA32 architect, responsible for all of Intel's x86 Pentium CPU architecture efforts (direct management included 40 – 110 people): Pentium Pro, Pentium II, III, 4; Initiated and led Intel's Pentium 4 CPU development
- **Senior CPU Architect**, Intel Corporation, Hillsboro OR, 1990-1992
One of three senior architects responsible for conceiving Intel's P6 microarchitecture, the core of the company's Pentium II, Pentium III, Celeron, Xeon, and Centrino families
- **Hardware Architect**, Multiflow Computer, New Haven, CT 1985-1990
One of seven hardware engineers who created the world's first VLIW (very long instruction word) scientific supercomputer under direction of Josh Fisher
- **Hardware Engineer** (part-time) Perq Systems, Pittsburgh PA, 1980 - 1984
Hardware design engineer working on graphics display hardware for first generation bit-slice-based engineering workstations
- **Member of Technical Staff**, Bell Telephone Laboratories, Holmdel, NJ, 1977-1980
Hardware design engineer working on 8 and 32-bit microprocessors

EDUCATION

- **PhD in Computer Engineering**, Carnegie-Mellon University, 1985
- **MSEE** in Computer Engineering, Carnegie-Mellon University, 1978

- **BSEE** in Electrical Engineering, University of Pittsburgh, 1977

PUBLICATIONS

Wrote foreword to "Weaving High Performance Multi-Core Processor Fabric: Essential Insights to the Intel Quickpath Architecture", Maddox, Singh, Safranek, Intel Press 2009

National Research Council, The Future of Computing Performance: Game Over or Next Level?, Washington, D.C.: The National Academies Press, 2010.

VLIW: The Unlikeliest Architecture, IEEE Solid State Circuits News, 2009

Wrote intro to DE Shaw's article on the Anton molecular folding engine in CACM, July 2008

Contributed parameterized chapter 2 problem sets to Hennessy & Patterson's "Computer Architecture: A Quantitative Approach, 4th Edition" 2006

The Pentium Chronicles, IEEE/Wiley, December 2005

IEEE Computer Magazine, 48 columns for "At Random" column 2002-2005

Wrote foreword to Josh Fisher's book "Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools", Morgan-Kaufman 2005

We May Need A New Box, IEEE Computer March 2004

Superscalar Processor Design, P6 chapter, Shen & Lipasti, McGraw-Hill 2003

Embedded Everywhere, National Academy of Science, October 2001

Intel's College Hiring Methods and Recent Results, Microelectronics Systems Education Conference, Robert Colwell, Gary Brown, Frank See, July 1999

Microprocessor, Wiley & Son Technical Encyclopedia, 1999

Challenges and Trends in Processor Design, roundtable discussion in IEEE Computer, January 1998

A 0.6um BiCMOS Processor with Dynamic Execution, Robert P. Colwell, Randy L. Steck, 1995 IEEE International Solid State Circuits Conference, pp. 176-177 (won best paper award)

Latent Design Faults in the Development of Multiflow's TRACE/200, 22nd Annual International Symposium on Fault-Tolerant Computing, Boston MA, July 1992

Architecture and Implementation of a VLIW Supercomputer, Robert P. Colwell, W. Eric Hall, Chandra S. Joshi, David B. Papworth, Paul K. Rodman, James E. Tornes, Proceedings of Supercomputing '90, New York, November 1990

A VLIW Architecture for a Trace Scheduling Compiler, Robert P. Colwell, Robert P. Nix, John J. O'Donnell, David B. Papworth, Paul K. Rodman, IEEE Trans. on Comp., V. 37, N. 8, Aug.1988

A VLIW Architecture for a Trace Scheduling Compiler, Robert P. Colwell, Robert P. Nix, John J. O'Donnell, David B. Papworth, Paul K. Rodman, Proceedings of the 2nd Int'l Conf. on

Architectural Support for Programming Languages and Operating Systems, Oct. 1987, Palo Alto CA (2021 Winner of Influential Paper Award from ASPLOS Conference)

Fast Object-Oriented Procedure Calls: Lessons from the Intel 432, Edward F. Gehringer, Robert P. Colwell, ISCA 13, June 1986, pp. 92-101

The Performance Effects of Architectural Complexity in the Intel 432, Robert P. Colwell, Edward F. Gehringer, E. Douglas Jensen, ACM Transactions on Computer Systems, Aug. 1988, V. 6, N. 3

A Display Architecture for Driving Two Different Bitmapped Displays from One Frame Buffer, Robert P. Colwell, 1st Int'l Conference on Computer Workstations, San Jose CA, November 1985

Computers, Complexity, and Controversy, R.P. Colwell, C.Y. Hitchcock III, E.D. Jensen, H.M. Brinkley Sprunt, C.P. Kollar, IEEE Computer, September, 1985, pp. 8-19

The Performance Effects of Function Migration and Architectural Complexity in Object-Oriented Systems, Robert P. Colwell, PhD thesis, Carnegie-Mellon University, Pittsburgh, PA, August 1985

Peering Through The RISC/CISC Fog: An Outline Of Research, Computer Architecture News, Vol. 11, No. 1, March 1983 pp. 44-50

A Perspective on the Processor Complexity Controversy, Proceedings of the International Conference on Computer Design, 1983, pp. 613-616

The Origin of Intel's Micro-ops, invited paper, IEEE Micro 2021

LECTURES AND INVITED TALKS

P6: Myths and Pipelined Realities, MP Forum '95 in Santa Clara

Evolution of Slot 1 and Slot 2, MP Forum '97 in Santa Clara

Micro '30 keynote speaker, 1997, San Jose

HPCA2 keynote speaker, Santa Clara, 1996

Talks on computing futures at CMU and Oregon Graduate Institute, Intel's Design Test and Technology Conference 1997-1998 (best presentation DTTC), invited keynote DTTC '04

LCPC (Languages and Compilers for Parallel Computing) keynote speaker, San Jose 1996

Intel Research Forum invited speaker, Hillsboro '96, Santa Clara '99

Intel Distinguished Lecture Series talks on the Pentium Pro at BYU, MIT, UCB, Stanford, CMU, Illinois, Wisconsin, Univ of Washington, OGI, UCLA

Distinguished Lectures: UC Davis May 2003; Carnegie-Mellon Univ Nov. 2003; USC April 2004

Microprocessor Report dinner speaker on Pentium Pro, March '95

Neural Networks for Computing Conference, Snowbird Utah, April 1994

IEEE Winter VLSI Workshop 1995

DARPA Winter PI conference, Pasadena CA, January 1994

International Applications Conference, San Diego CA, June 1994

Nature's Paradigm and the Challenge of Validation, Intel Validation Summit 1998, invited talk

Validation Lessons from Elsewhere, Intel Validation Summit 1999, invited talk

ISCA keynote, Anchorage Alaska, June 2002

ECE380 Seminar invited talk, Stanford Univ. February 2004

Invited speaker, Technology Management Lecture Series, PSU May 2004

Invited speaker, CSE Division Wide Seminar, University of Michigan, January 2005

Invited keynote speaker, IEEE Int'l Symp. on Async Circuits and Systems, NYC, March 2005

Invited speaker, IEEE Management Series, Portland OR, April 2005

Eckert-Mauchly Award acceptance speech, ISCA, Madison Wisconsin, June 2005

Invited keynote, International Multiconference on Computer Science and Computer Engineering, Las Vegas NV, June 2005

Invited speaker: Google, Sun Labs, Portland State University 2005

Invited speaker: Cadence, Carnegie-Mellon Univ. CS, Univ. of Rochester, Walla Walla College 2006

Invited keynote, PICMET, Portland Oregon, August 2005

Distinguished lecture, Univ. of Utah, March 2006

Invited speaker: Computer Science Symposium, St. Petersburg, Russia 2006

Invited speaker, IEEE-CS 60th anniversary meeting, Santiago Chile, San Diego CA 2006

Invited speaker, National Academies "Distinguished Voices" lecture series, April 2007, Irvine CA

Invited speaker, FCRC "Future Of Computer Architecture 2007", June, San Diego CA

Invited keynote speaker, ASAP 2007 conference, July, Montreal Canada 2007

Invited speaker, UC Irvine, "How To Be a Successful Engineer", Feb. 2008

Invited speaker, US Naval Workshop on Ship Design, Williamsburg, VA May 2008

Invited speaker, DARPA DSRC summer session, Santa Cruz CA July 2008

Distinguished Hopeman Lecture, Grove City College, April 2009

Many invited talks as DARPA MTO spokesperson on the end of Moore's Law 2011-2014

Invited speaker, Microsoft Research 20th Anniversary Symposium, Sept. 2011

Invited speaker, Computer Science and Telecommunications Board (CSTB), Sept. 2011

Invited speaker, Secretary of Defense Corporate Fellows, July 2012, 2013

Invited speaker after-dinner talk, Salishan Conference on High Performance Computing, April 2013

Invited speaker, Industrial Physics Forum, Baltimore MD, March 2013

Invited speaker, Computing Community Consortium (CCC), Pgh PA, March 2013

Invited speaker, National Defense University College, Wash. DC, May 2013

Invited speaker, Design Automation Conference, Austin TX, June 2013

Invited keynote, Hot Chips Conference, Stanford, August 2013

Invited speaker, Gov't Forum on Moore's Law, Wash. DC, November 2013

Invited talks at UT Austin, seminar & computer architecture lecture, November 2013

Invited speaker, Rebooting Computing, Wash. DC, December 2013

Invited speaker, Dartmouth College, January 2014

Invited speaker, MIT Annual Research Conference (MARC), January 2014

Invited speaker, Virginia Tech Univ., February 2014

Invited speaker, Univ. of Rochester, March 2014

Invited speaker, IEEE Technology Time Machine conf, October 2014

Invited speaker, DARPA HAPTIX kickoff meeting, Arlington VA, Nov. 2014

Invited speaker, CSTB Continuing Innovation in IT workshop, Washington DC, Mar. 2015

Invited keynote, Stanford SystemX "Headlights" Workshop, April 2015

Invited keynote, Berkeley Energy Efficient Electronics Systems Symposium, Oct. 2015

Invited speaker, University of Washington, Nov. 2015

Invited speaker, Arizona State University, Feb. 2016

Invited keynote, DoE Extreme Heterogeneity workshop, January 2018

Invited keynote, DARPA NICE workshop, Feb. 2018 (Neuro-Inspired Computing Elements), Oregon

Invited keynote, ModSim workshop, Seattle, August 2018

ECE Commencement speaker, Portland State University, June 2019

Member, National Academy of Engineering review panel for NIST (National Institute of Standards and Technology) Nanotechnology Division, June 2021

Invited keynote, ModSim workshop, Seattle, August 2023

PANEL SESSIONS

DAC '91 panel session panelist; DAC '92 CAD tools workshop instructor

ICCD '91 moderator/organizer of panel session, San Jose CA

ICCAD-94, panel session panelist, November 1994, San Jose CA

Micro 26 '93, moderator/organizer of panel session, Portland OR

ISCA workshop talk, Santa Margherita Ligure, Italy 1995, panelist Phila. PA 1996

PAID 97 Workshop talk on "accidental performance decisions" with Dave Papworth

FPGA panel session panelist, November 1996, Monterey CA

ASPLOS-VII panel session panelist, October 1998, San Jose CA

IEEE Workshop on Low-Power design panel session, San Diego, CA 1999

Four panel sessions in 2000 at various conferences

Computer Research Assoc. "Grand Challenges" conference, Santa Cruz CA, Dec. 2005

DARPA MTO Exposition, Arlington VA July 2014

NSF Future Computing evaluation panel April 2018

ModSim 2018 panelist, Seattle WA

CONFERENCE COMMITTEES

ICCD 1990, 1991, 1992, 1993, 1994, 1995

IEEE Micro 24, 26, 27, 30, 31, 32, general co-chair 37, 39, 40, 41

ISCA 1999, 2000, 2008, 2009, 2010, 2015

Supercomputing 2013, 2014

TECHNICAL EXPERT LEGAL CASES WORKED

AVM v. Intel, Wilmer Hale, Lauren Fletcher, 2015-2017

Damages expert report, deposed, trial Wilmington DE May 2017

Futurelink v. Intel, Kirkland Ellis, Eric Cheng, 2014-2017

Invalidity, non-infringement expert reports, deposed 3 times, case settled 8/17/2023

Broadcom v. Renesas, Morrison Foerster, Fahd Patel, Daniel Muino, 2018-2020

Invalidity, non-infringement expert reports, deposed twice, testified at ITC hearing

Semcon v. Amazon, Sidley Austin, Tung Nguyen, Cal Butcher, 2019

Invalidity expert report, deposed 8/15/19, case settled

VLSI Tech. v. Intel, Wilmer Hale, Christine Duh, George Manley, Jordan Hirsch, 2017-2021

Damages expert report, Rebuttal report, deposed twice

CCO (Computer Circuit Operations) v Marvell, Sheppard Mullin, Wendy Cheung, 2020

Declaration filed, case settled August 2020

ACQIS v. Samsung, DLA Piper, Gianni Minutoli, 2021

Claim Construction declaration, deposed twice, case settled Dec. 2021

ACQIS v. Inventec, BlankRome, Greg Hermann, 2022

Damages & apportionment, case settled May 2022

Apple Inc. v. Future Link Systems, Inter Partes Review, EriseIP, Adam Seitz

IPR declaration filed, case settled April 2022

Apple Inc. v. Future Link Systems, Fish Richardson, John Brinkmann

Work on claim construction, case settled April 2022

ACQIS v. Microsoft, DLA Piper, Gianni Minutoli, 2022

Claim Construction declaration, case settled June 2023

OTHER

Selected as member of ISAT (Information Systems Advanced Technology) panel for DARPA, 2006-2009, co-chaired Machine Learning on Multicore 2009 with Carlos Guestrin and Greg Morrisett

Panelist, Dept of Defense Summer Study on Future Technology, summer 1999, Washington DC

CSTB Panelist, National Academy of Science, Networks of Embedded Processors, 1999-2000, Wash. DC

CSTB Panelist, National Academy of Science, Sustaining Growth in Computing Performance, 2006-2011, Wash. DC

IEEE Computer Magazine editor for High Performance Computing, 1995 to 1999

IEEE Computer Magazine editorial board member, Perspectives editor, 1999-present

Reviewer of dozens of technical books for Morgan Kaufmann, Mindshare, Addison-Wesley

Committee member on NSF funding for computer arch futures, Philadelphia, 1996

Intel Innovator's Day finalist '93, judge '95, judge '97

IEEE Senior Reviewer status in 1994, 1995, 1996 (conference papers, books, magazine articles)

Intel P6 public spokesman at dozens of radio, TV, and magazine interviews

Intel Divisional Award 1993 for DFA performance modeling tool

Intel Achievement Award 1996 for Pentium Pro Microarchitecture

CMU Alumni Merit Award, 1996, for technical leadership on Pentium Pro development

ACM Eckert-Mauchly award committee member, 1998-2001

Univ. of Pgh. Distinguished Alumni Award, 2000, for technical leadership on Intel's microprocessors

Univ. of Pgh. University Achievement Award, 2001, for accomplishments in field of Computing

Carnegie-Mellon Distinguished Alumni Fellows Award 2001

PICMET "Medal of Excellence" 2005

Judge for CSIDC (Computer Society Int'l Design Competition) 2005, 2006

Instructor ECE570, Adv. Computer Arch., Oregon State Univ., winter semesters 2000, 2003

Inventor or co-inventor on 40 patents

EXHIBIT 5

EXHIBIT 6

EXHIBIT 7

EXHIBIT 8

**ZIAD ASGHAR Conf. AEO - 30b6
ARM, LTD. V. QUALCOMM INC.**

November 08, 2023

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<p>1 IN THE UNITED STATES DISTRICT COURT 2 FOR THE DISTRICT OF DELAWARE 3 4 5 ARM LTD., a U.K. corporation,) 6 Plaintiff,) Case No. 22-1146-MN 7 vs.) 8 QUALCOMM INC., a Delaware) 9 corporation, QUALCOMM TECHNOLOGIES,) 10 INC., a Delaware corporation, and) 11 NUVIA, INC., a Delaware) 12 corporation,) 13 Defendants.) 14 15 16 17 18 19 20 21 22 23 24 25</p> <p style="text-align: center;">C O N F I D E N T I A L ATTORNEYS' EYES ONLY</p> <p>VIDEOTAPED DEPOSITION OF QUALCOMM 30(b)(6) designee ZIAD ASGHAR</p> <p>Deposition taken on: Wednesday, November 8, 2023, 8:39 a.m.</p> <p>12531 High Bluff Drive, Suite 100 San Diego, California</p> <p>Reported By: Kimberly Reichert, CSR 10986 Job No. J10465669</p>	<p>1 APPEARANCES OF COUNSEL: 2 For the Plaintiff: 3 MORRISON & FOERSTER LLP 4 By: DANIEL P. MUINO, ESQ. 5 2100 L Street, NW 6 Suite 900 7 Washington, DC 20037 8 dmuino@mofo.com 9 10 For Defendants: 11 PAUL, WEISS, RIFKIND, WHARTON 12 & GARRISON, LLP 13 By: JACOB BRALY, ESQ. 14 CATHERINE NYARADY, ESQ. 15 1285 Avenue of the Americas 16 New York, New York 10019 17 jbraly@pualweiss.com 18 cnyarady@paulweiss.com 19 20 QUALCOMM INCORPORATED 21 QUALCOMM LEGAL COUNSEL 22 By: KURT KJELLAND, ESQ. 23 5775 Morehouse Drive 24 San Diego, California 92121 25 kurtk@qualcomm.com</p> <p>Also Present: Rene Sanchez, Videographer</p>
Page 2	Page 4
<p>1 IN THE UNITED STATES DISTRICT COURT 2 FOR THE DISTRICT OF DELAWARE 3 4 5 ARM LTD., a U.K. corporation,) 6 Plaintiff,) Case No. 22-1146-MN 7 vs.) 8 QUALCOMM INC., a Delaware) 9 corporation, QUALCOMM TECHNOLOGIES,) 10 INC., a Delaware corporation, and) 11 NUVIA, INC., a Delaware) 12 corporation,) 13 Defendants.) 14 15 16 17 18 19 20 21 22 23 24 25</p> <p style="text-align: center;">C O N F I D E N T I A L ATTORNEYS' EYES ONLY videotaped deposition</p> <p>of QUALCOMM 30(b)(6)designee ZIAD ASGHAR, taken on behalf of the Plaintiff, at 12531 High Bluff Drive, Suite 100, San Diego, California, commencing at 8:39 a.m., Wednesday, November 8, 2023, before Kimberly Reichert, Certified Shorthand Reporter No. 10986.</p>	<p>1 I N D E X 2 DEPONENT EXAMINED BY PAGE 3 ZIAD ASGHAR MR. MUINO 9 4 5 6 EXHIBITS FOR IDENTIFICATION PAGE 7 Plaintiff's 8 Exhibit 1 LinkedIn Profile for 14 9 Ziad Asghar 10 11 Exhibit 2 Arm Ltd's First Notice of 29 12 Deposition of Qualcomm 13 Exhibit 3 Arm Ltd's First Notice of 34 14 Deposition of Nuvia, Inc. 15 16 Exhibit 4 Amended and Restated Architecture 36 17 License Agreement between Arm 18 Limited and Qualcomm Global Trading 19 20 Exhibit 5 E-mail to Andy Oberst 75 21 from Ziad Asghar 22 dated 5/15/2013 23 24 Exhibit 6 A document about Arm as a company 76 25 and looking at what their business model looks like 26 27 Exhibit 7 E-mail chain 87 28 top e-mail to Akash Palkhiwala 29 dated 3/10/2019 30 31 Exhibit 8 E-mail chain 95 32 top e-mail to Travis Lanier, et al. 33 dated 9/9/2019 34 35 Exhibit 9 Document entitled "ARM 99 36 alternative strategies" 37 38 Exhibit 10 E-mail chain 105 39 top e-mail to Quinn Li, et al. 40 dated 6/19/2020</p>

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2	Plaintiff's		2	Plaintiff's	
3	Exhibit 11 E-mail chain	115	3	Exhibit 34 E-mail chain	249
4	top e-mail to Cristiano Amon, et al.			top e-mail to Asaf Shen, et al.	
5	dated 8/27/2020			dated 3/9/2022	
6	Exhibit 12 E-mail chain	126	4		
7	top e-mail to Azzedine Touzni, et al.		5	Exhibit 35 E-mail chain	252
8	dated 1/13/2021			top e-mail to Alex Katouzian	
9	Exhibit 13 Document entitled "Qualcomm to	140	6	dated 8/15/2022	
10	Acquire Nuvia" dated 1/13/2021		7	Exhibit 36 E-mail chain	254
11	Exhibit 14 E-mail chain	144		top e-mail to Ziad Asghar and Jim	
12	top e-mail to Michelle Gerevas		8	Thompson dated 7/22/2022	
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14	Exhibit 15 E-mail to Rajiv Gupta, et al.	146		top e-mail to Ziad Asghar	
15	from Raghu Sankuratri		10	dated 8/23/2022	
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17	Exhibit 16 Letter to Paul Williamson	157		Krishnamohan from Sender Unspecified	
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19	dated 1/27/2021		13	Exhibit 39 E-mail chain	269
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21	from Paul Williamson		14	from Savi Soin	
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24	top e-mail to Rajiv Gupta, et al.		17	QUESTIONS INSTRUCTED NOT TO ANSWER:	
25	dated 7/1/2021		18	PAGE LINE	
	Exhibit 19 Letter to Ziad Asghar	171	19	13 9	
	from Paul Williamson		20	29 25	
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1	EXHIBITS FOR IDENTIFICATION (Cont.)		1	SAN DIEGO, CALIFORNIA	
2	Plaintiff's		2	WEDNESDAY, NOVEMBER 8, 2023; 8:39 A.M.	
3	Exhibit 22 Technology License Agreement	184	3		
4	between Arm Limited and Nuvia, Inc.		4	THE VIDEOGRAPHER: Good morning. This is tape	
5	Exhibit 23 Letter to Paul Williamson	192	5	No. 1 to the videotaped deposition of Ziad Asghar	
6	from Ziad Asghar		6	testifying in the matter of Arm Limited, a UK	
7	dated 3/14/2021		7	Corporation versus Qualcomm Inc., et al. This case	
8	Exhibit 24 E-mail chain	196	8	is being heard before the United States District	
9	top e-mail from RK Chunduru		9	Court for the District of Delaware. The case number	
10	dated 7/1/2021		10	is 22-1146-MN. This deposition is being held at	
11	Exhibit 25 E-mail chain	202	11	12531 High Bluff Drive, Suite 100 in San Diego,	
12	top e-mail from Ziad Asghar		12	California 92130. Today's date is November 8th,	
13	dated 5/7/2022		13	2023, and the time is 8:39 a.m. Pacific Standard	
14	Exhibit 26 E-mail to Will Abbey, et al.	205	14	Time.	
15	from Ziad Asghar		15	My name is Rene Sanchez and I'm the	
16	dated 3/25/2021		16	videographer here with our court reporter Kim	
17	Exhibit 27 E-mail chain	207	17	Reichert. Would counsel please introduce yourselves	
18	top e-mail to Ziad Asghar		18	and your affiliations and the witness will be sworn.	
19	dated 4/2/2021		19	MR. MUINO: Daniel Muino of Morrison & Foerster	
20	Exhibit 28 E-mail to Manu Gulati and	214	20	for plaintiff Arm Limited.	
21	Ziad Asghar from Sender Unspecified		21	MR. BRALY: Jacob Braly with Paul, Weiss for	
22	Exhibit 29 E-mail chain	216	22	defendants and the witness. With me are Catherine	
23	top e-mail to RK Chunduru		23	Nyarady, also from Paul, Weiss, and Kurt Kjelland	
24	dated 4/21/2021		24	from Qualcomm.	
25	Exhibit 30 E-mail chain	221	25	///	
	top e-mail to Cristiano Amon				
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<p style="text-align: right;">Page 9</p> <p>1 ZIAD ASGHAR, 2 deponent, was sworn and examined 3 and testified as follows: 4 5 THE REPORTER: Mr. Asghar, will you raise your 6 right hand for me, please. Do you solemnly state 7 that the evidence you shall give in this matter now 8 pending shall be the truth, the whole truth and 9 nothing but the truth so help you God? 10 THE WITNESS: I do. 11 12 EXAMINATION 13 BY MR. MUINO: 14 Q Good morning, Mr. Asghar. 15 A Good morning. 16 Q Could you please state your name for the 17 record? 18 A Ziad Asghar. 19 Q What is your current address? 20 A My current home address is 17019 Coyote 21 Bush Drive, San Diego 92127. 22 Q Are you currently employed by Qualcomm? 23 A I am. 24 Q And what is your current position at 25 Qualcomm?</p>	<p style="text-align: right;">Page 11</p> <p>1 A Yes. 2 Q Do you recall the -- in a general sense 3 the nature of the case? 4 A It's been a little while, but it had to do 5 with process technology. 6 Q Was Qualcomm the plaintiff or the 7 defendant in the case? 8 A I think we were neither from what I 9 recall, but it's been a while. 10 Q Apart from that, have you had your 11 deposition taken on other occasions? 12 A No. 13 Q Have you ever testified in court? 14 A No, I haven't. 15 Q So you might remember from your last 16 experience, but the basic ground rule here is that 17 you and I should try to avoid speaking over one 18 another so the court reporter can take down 19 everything that we're saying. So, if you give me a 20 chance to finish my questions, I'll give you a 21 chance to answer fully; is that okay? 22 A Sounds good. 23 Q From time to time counsel might object to 24 a question that I ask. Unless he instructs you not 25 to answer a question, you should go ahead and answer</p>
<p style="text-align: right;">Page 10</p> <p>1 A My current position is SVP product 2 management or senior V.P. of product management. 3 Q Is that for a specific Qualcomm product, 4 like the Snapdragon product? 5 A So my role is horizontally across the 6 company, which means my team creates all the 7 technology IPs from a product perspective for all 8 the different businesses that Qualcomm operates in 9 for application process and technology. 10 Q Have you ever had your deposition taken 11 before? 12 A I have. 13 Q How many times? 14 A If I recall, once. 15 Q When was that? 16 A I believe it was during COVID times, so 17 I'm not exactly sure, but a couple years plus. 18 Q 2020? 19 A I don't remember exactly. I think about 20 '20, '21. 21 Q Do you recall which case that was? 22 A This was a case that had to do with one of 23 our -- a case that had to do with Samsung. 24 Q You were testifying in your capacity as 25 your position at Qualcomm?</p>	<p style="text-align: right;">Page 12</p> <p>1 to the best of your ability. 2 Do you understand that? 3 A I understand. 4 Q I usually take breaks about every hour. 5 If you need a break in between, just let me know. I 6 understand we will do a short lunch break today and 7 I know there's an hour period where you need to have 8 a meeting, so we will respect that time as well. 9 A I appreciate it. 10 Q Is there any reason that you can't give 11 full and complete testimony today? 12 A Shouldn't be any reason. 13 Q Did you do anything to prepare for today's 14 deposition? 15 A I had a discussion with my lawyers. 16 Q And which lawyers did you have a 17 discussion with? 18 A All three of them here. 19 Q How many occasions did you meet with them? 20 A Just once. 21 Q When was that? 22 A Monday. 23 Q How long did that last? 24 A A few hours. 25 Q Did you review any documents to prepare</p>

<p style="text-align: right;">Page 53</p> <p>1 A Version 9.</p> <p>2 Q Are there -- is there more than one</p> <p>3 [REDACTED] core?</p> <p>4 A There is. There are more [REDACTED] cores,</p> <p>5 yes.</p> <p>6 Q Let me get a list of the [REDACTED] cores.</p> <p>7 What's the first one?</p> <p>8 A So we have the first one, which is going</p> <p>9 to be a [REDACTED] large. That's going to go into a</p> <p>10 smartphone SOC.</p> <p>11 Q Does that smartphone SOC have a name?</p> <p>12 A It's called [REDACTED]</p> <p>13 Q And you said there are other [REDACTED] cores</p> <p>14 also?</p> <p>15 A Yes, [REDACTED] medium core for mobile.</p> <p>16 That's going to also go into [REDACTED]</p> <p>17 Q What is the purpose of offering a large</p> <p>18 core and a medium core for the [REDACTED] SOC?</p> <p>19 A In a smartphone chip you want to have the</p> <p>20 ability to go to high performance, but you also want</p> <p>21 to have the ability to be able to operate a very low</p> <p>22 part consumption. So when you're using the phone</p> <p>23 actively, you go to the big core. When you use it,</p> <p>24 for example, it's sitting in your pocket it's</p> <p>25 typically using the smaller core. You need low</p>	<p style="text-align: right;">Page 55</p> <p>1 this time. We might do others and might use them in</p> <p>2 different products still being planned.</p> <p>3 Q Okay. So I planned to do this later in</p> <p>4 the day, but since we got on this subject I'm going</p> <p>5 to ask you more details about these cores. We still</p> <p>6 have some time before we take a break. Let's start</p> <p>7 back with the [REDACTED] core for the [REDACTED] SOC. Was</p> <p>8 that the first [REDACTED] core that Qualcomm worked on?</p> <p>9 A This was the first custom core that we</p> <p>10 developed.</p> <p>11 Q And when?</p> <p>12 A In the [REDACTED] family, just to be clear.</p> <p>13 All the other parts that I mentioned earlier that</p> <p>14 were also custom cores in the past.</p> <p>15 Q The [REDACTED] core was originally acquired</p> <p>16 from Nuvia; is that right?</p> <p>17 A What we acquired or what Nuvia was working</p> <p>18 on was a server product. What we have in [REDACTED] is a</p> <p>19 PC product. From my product perspective, servers</p> <p>20 are very different products than PC, and their</p> <p>21 requirements are vastly different. This is a custom</p> <p>22 core for the PC market. Very different.</p> <p>23 Q The [REDACTED] core that Qualcomm acquired</p> <p>24 with Nuvia was for the server market?</p> <p>25 A It was for the server market.</p>
<p style="text-align: right;">Page 54</p> <p>1 performance, high performance, low power, high</p> <p>2 power, and it also allows you to get to a better</p> <p>3 area.</p> <p>4 Q Is there a price difference between those</p> <p>5 cores?</p> <p>6 A Custom cores, I don't believe there is a</p> <p>7 difference.</p> <p>8 Q In terms of the price that Qualcomm is</p> <p>9 charging to customers?</p> <p>10 A Oh, no, no. This goes into a single SOC,</p> <p>11 right, so we just offer the SOC, so the big or the</p> <p>12 large and medium go together in SOC.</p> <p>13 Q Have we exhausted the list of [REDACTED]</p> <p>14 cores?</p> <p>15 A There are more.</p> <p>16 Q What is the next one?</p> <p>17 A So the next one would be a [REDACTED] large</p> <p>18 and medium that goes into a PC product for PC</p> <p>19 market, and that one is called [REDACTED].</p> <p>20 Q [REDACTED] SOC?</p> <p>21 A [REDACTED], and that's a PC product.</p> <p>22 Q [REDACTED] you said?</p> <p>23 A That's right.</p> <p>24 Q Any other [REDACTED] cores?</p> <p>25 A These are the ones that I have planned at</p>	<p style="text-align: right;">Page 56</p> <p>1 Q And did that pertain to an SOC called</p> <p>2 [REDACTED]?</p> <p>3 A That's correct.</p> <p>4 Q That's [REDACTED]</p> <p>5 A That's right.</p> <p>6 Q You didn't mention that in your list of</p> <p>7 cores that Qualcomm worked on. Did Qualcomm</p> <p>8 continue the development of the [REDACTED] core for the</p> <p>9 [REDACTED] SOC after the acquisition of Nuvia?</p> <p>10 A It was more the SOC work that continued</p> <p>11 for some time, but that was discontinued.</p> <p>12 Q When was that discontinued?</p> <p>13 A I want to say around after March or April</p> <p>14 of '22. I don't know the exact date, but somewhere</p> <p>15 thereabouts.</p> <p>16 Q In March or April of 2022, Qualcomm</p> <p>17 discontinued --</p> <p>18 A After that time, not in March/April, after</p> <p>19 March or April of '22.</p> <p>20 Q After March or April of 2022, Qualcomm</p> <p>21 discontinued its work on the [REDACTED] SOC; is that</p> <p>22 right?</p> <p>23 A That's right.</p> <p>24 Q The [REDACTED]n SOC included a [REDACTED] core; is</p> <p>25 that right?</p>

[REDACTED]

<p style="text-align: right;">Page 57</p> <p>1 A For the server market, that's right.</p> <p>2 Q Why did Qualcomm discontinue the [REDACTED]</p> <p>3 SOC?</p> <p>4 A I believe we had gotten some sort of</p> <p>5 notice from Arm and we wanted to just make sure we</p> <p>6 are abiding by all contracts. I was part of it.</p> <p>7 Q So part of the reason for discontinuing</p> <p>8 the [REDACTED] SOC was because of the positions that Arm</p> <p>9 was taking?</p> <p>10 A Yes, partly.</p> <p>11 Q Were you involved in those conversations</p> <p>12 with Arm?</p> <p>13 MR. BRALY: Objection.</p> <p>14 THE WITNESS: Not with Arm, but internally I</p> <p>15 was in some discussions.</p> <p>16 BY MR. MUINO:</p> <p>17 Q What was your understanding of -- this is</p> <p>18 the early 2022 time frame, what was your</p> <p>19 understanding of what Arm was saying to Qualcomm</p> <p>20 that caused Qualcomm to discontinue the [REDACTED] SOC?</p> <p>21 A From a product perspective, Arm was</p> <p>22 claiming that there were certain Arm technologies in</p> <p>23 those products and there was a concern on our side.</p> <p>24 We wanted to, of course, abide by all the rules and</p> <p>25 that's why we delayed [REDACTED] to actually make sure</p>	<p style="text-align: right;">Page 59</p> <p>1 acquisition of Nuvia by Qualcomm occurred in March</p> <p>2 of 2021; is that correct?</p> <p>3 A I believe so.</p> <p>4 Q And was that the time at which the [REDACTED]</p> <p>5 core for [REDACTED] got started?</p> <p>6 A After that, yes.</p> <p>7 Q The employees, the engineers who were</p> <p>8 working on [REDACTED] for [REDACTED] a, were they the former</p> <p>9 Nuvia engineers?</p> <p>10 A I'm not aware of the exact personnel, but</p> <p>11 I'm assuming they were there and, of course,</p> <p>12 Qualcomm had CPU capable people as well, so the</p> <p>13 combined team.</p> <p>14 Q And the [REDACTED] core for the [REDACTED] SOC was</p> <p>15 based at the start on the [REDACTED] core that came in</p> <p>16 from Nuvia; correct?</p> <p>17 A It was a new core. Like I explained, that</p> <p>18 the server market and PC markets are very different.</p> <p>19 You have liquid cooling and a very different sort of</p> <p>20 parameters in the server market compared to what you</p> <p>21 have in a device like a PC. So these are different</p> <p>22 cores.</p> <p>23 Q My question really is the [REDACTED] core for</p> <p>24 [REDACTED], it wasn't developed from scratch, right, it</p> <p>25 started with the RTL from the [REDACTED] that came in</p>
<p style="text-align: right;">Page 58</p> <p>1 that we remove any IPs there might be any concern</p> <p>2 around, and, similarly, [REDACTED] would have to make</p> <p>3 those changes, and it was canceled. A lot of work</p> <p>4 was wasted.</p> <p>5 Q Is there any current plan to bring the</p> <p>6 [REDACTED] SOC back?</p> <p>7 A I'm not aware of any such plan.</p> <p>8 Q Does Qualcomm have any plan to use any</p> <p>9 version of the [REDACTED] core for server SOC's?</p> <p>10 A I'm not aware of any such plan.</p> <p>11 Q The employees who were working on the</p> <p>12 [REDACTED] SOC, were they redeployed to other purposes?</p> <p>13 A It's more of an engineering question</p> <p>14 really. I would think so.</p> <p>15 Q Did Qualcomm have other reasons for</p> <p>16 discontinuing the [REDACTED] SOC?</p> <p>17 A Not anything that I can recall, but there</p> <p>18 could have been other reasons.</p> <p>19 Q All right. Let me ask you now about the</p> <p>20 [REDACTED] core for the [REDACTED] SOC. When did Qualcomm</p> <p>21 begin work on that?</p> <p>22 A Pretty much once we started to have our</p> <p>23 Qualcomm custom CPU team in place, we started to</p> <p>24 work on the CPU for [REDACTED].</p> <p>25 Q So we are oriented in terms of time, the</p>	<p style="text-align: right;">Page 60</p> <p>1 with Nuvia?</p> <p>2 A I don't believe so, but that should be a</p> <p>3 question for engineering.</p> <p>4 Q You're not sure about that?</p> <p>5 A No, I don't think it came from there, but</p> <p>6 it's a question, for engineering like I mentioned.</p> <p>7 Q It isn't your understanding that [REDACTED]</p> <p>8 for [REDACTED] is a completely new core, is it?</p> <p>9 MR. BRALY: Objection.</p> <p>10 THE WITNESS: It's a core that's a custom core</p> <p>11 that's developed for a very different market, like I</p> <p>12 was explaining. So from a PC perspective the</p> <p>13 parameters are very different from what a server CPU</p> <p>14 requires.</p> <p>15 BY MR. MUINO:</p> <p>16 Q I understand. What I understand is the</p> <p>17 connection between the [REDACTED] core that Nuvia had</p> <p>18 begun and started to develop and the [REDACTED] core</p> <p>19 that was developed for [REDACTED], the [REDACTED]</p> <p>20 core, was derived in some way from the [REDACTED]</p> <p>21 core; correct?</p> <p>22 MR. BRALY: Objection; asked and answered.</p> <p>23 THE WITNESS: I'm not aware of that. That</p> <p>24 should be an engineering question.</p> <p>25 ///</p>

[REDACTED]

<p style="text-align: right;">Page 61</p> <p>1 BY MR. MUINO:</p> <p>2 Q It wasn't a coincidence they're both</p> <p>3 called [REDACTED]; right?</p> <p>4 MR. BRALY: Objection.</p> <p>5 THE WITNESS: You know, we change the names of</p> <p>6 products on a daily basis. Names pretty much mean</p> <p>7 nothing. Internal code names change all the time.</p> <p>8 BY MR. MUINO:</p> <p>9 Q The engineering -- so the Nuvia engineers</p> <p>10 who joined Qualcomm after the acquisition in</p> <p>11 March 2021, they went to work on [REDACTED] for [REDACTED];</p> <p>12 correct?</p> <p>13 A Like I said, the combined Qualcomm CPU</p> <p>14 team which, of course, had a lot of capabilities</p> <p>15 before, but definitely required this team because</p> <p>16 they're a very good team and the combined team</p> <p>17 worked on the custom core.</p> <p>18 Q From a technical perspective, do you know</p> <p>19 what differences there are between the [REDACTED] core</p> <p>20 for [REDACTED] and the [REDACTED] core for [REDACTED]?</p> <p>21 MR. BRALY: Objection.</p> <p>22 THE WITNESS: I don't.</p> <p>23 BY MR. MUINO:</p> <p>24 Q You're not in a position to have looked at</p> <p>25 the RTL code?</p>	<p style="text-align: right;">Page 63</p> <p>1 Q That was October 23rd of this year?</p> <p>2 A Yes, October 23rd or 24th is when it was</p> <p>3 launched, yeah.</p> <p>4 Q Just so that I make sure I've asked this</p> <p>5 question, do you know in terms of the internal</p> <p>6 development of the [REDACTED] SOC, do you know</p> <p>7 approximately when that wrapped up?</p> <p>8 MR. BRALY: Objection.</p> <p>9 THE WITNESS: I don't honestly remember the</p> <p>10 exact dates, but for you to be able to launch a</p> <p>11 product it needs to have a certain degree of</p> <p>12 readiness.</p> <p>13 BY MR. MUINO:</p> <p>14 Q Obviously by the time the product was</p> <p>15 launched, October of 2023, [REDACTED] SOC was ready; is</p> <p>16 that correct?</p> <p>17 A You have to understand the software in our</p> <p>18 work continues on much afterwards, so that work, of</p> <p>19 course, is still going to be going on until you see</p> <p>20 commercial products come on the shelves. Hardware</p> <p>21 is different from software.</p> <p>22 MR. MUINO: Why don't we take a break.</p> <p>23 THE VIDEOGRAPHER: Off the record at 9:48 a.m.</p> <p>24 (A recess was taken from 9:48 a.m. to</p> <p>25 9:58 a.m.)</p>
<p style="text-align: right;">Page 62</p> <p>1 A No, I'm not an engineer, as you know.</p> <p>2 Q Has Qualcomm finished developing the</p> <p>3 [REDACTED] core for [REDACTED]?</p> <p>4 A Yes.</p> <p>5 Q When did that development finish?</p> <p>6 A I don't know the exact date, but, as you</p> <p>7 know, publicly we launched our Snapdragon X Elite</p> <p>8 product, which is the public name for [REDACTED].</p> <p>9 Q The Snapdragon X Elite included [REDACTED] SOC?</p> <p>10 A Like I said, the names mean nothing.</p> <p>11 Internal name is [REDACTED]. Snapdragon X Elite is the</p> <p>12 public name for [REDACTED].</p> <p>13 Q I appreciate that clarification. The</p> <p>14 Snapdragon X Elite contains the [REDACTED] core;</p> <p>15 correct?</p> <p>16 A That's right.</p> <p>17 Q Do you know how -- there's multiple</p> <p>18 [REDACTED] cores inside of that product; is that</p> <p>19 correct?</p> <p>20 A There are multiple [REDACTED] cores, yes.</p> <p>21 Q When was that product launched as it --</p> <p>22 when did it become available first?</p> <p>23 A Availability means a lot of things to</p> <p>24 people, but we have our summit October 23rd, which</p> <p>25 is publicly launched in Hawaii.</p>	<p style="text-align: right;">Page 64</p> <p>1 THE VIDEOGRAPHER: On the record at 9:58 a.m.</p> <p>2 MR. BRALY: I would just like to designate this</p> <p>3 transcript as highly confidential, attorneys' eyes</p> <p>4 only.</p> <p>5 BY MR. MUINO:</p> <p>6 Q Mr. Asghar, I want to go back to the</p> <p>7 subject of the different [REDACTED] cores. The [REDACTED]</p> <p>8 core for the [REDACTED] SOC was -- is an Arm-compliant</p> <p>9 core; correct?</p> <p>10 A It is based on Arm ISO, yes.</p> <p>11 Q Do you remember which version of the Arm</p> <p>12 ISO it's based on?</p> <p>13 A I believe it's version 8.</p> <p>14 Q Let me ask you about the [REDACTED] core for</p> <p>15 the [REDACTED] SOC. You indicated, I think, there were</p> <p>16 two versions of that [REDACTED] core; is that correct?</p> <p>17 MR. BRALY: Objection.</p> <p>18 THE WITNESS: These are two different cores. A</p> <p>19 [REDACTED]. Very different</p> <p>20 power, performance area, like I mentioned earlier.</p> <p>21 BY MR. MUINO:</p> <p>22 Q There's a [REDACTED]</p> <p>23 [REDACTED], both for the [REDACTED] SOC?</p> <p>24 A That's correct.</p> <p>25 Q When did Qualcomm start development of the</p>

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1 [REDACTED] ?

2 A Not sure of the exact date, but we launch

3 our mobile products every year, and we have

4 basically a cadence based on that.

5 Q Do you know approximately when that

6 development began?

7 A So the SOC development cycles are

8 significant. I don't remember the exact date.

9 Q The engineers who worked on the [REDACTED]

10 big core for [REDACTED], were they the former Nuvia

11 engineers?

12 A This was the combined team from the

13 Qualcomm and our acquisition. This is the Qualcomm

14 custom core team especially.

15 Q The Nuvia team was part of that team for

16 the [REDACTED]; correct?

17 MR. BRALY: Objection.

18 THE WITNESS: They were integrated into a

19 single team with Qualcomm engineers and the acquired

20 talent as well.

21 BY MR. MUINO:

22 Q Has Qualcomm finished developing the

23 [REDACTED] ?

24 A I believe so.

25 Q When did that development finish?

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1 A Again, there are hardware aspects and

2 software aspects. The first tape out, as we call

3 it, already happened. The commercial tape out is

4 going to be happening by, I believe, January time

5 frame or something.

6 Q You said the first tape out of the [REDACTED]

7 [REDACTED] has already occurred?

8 A [REDACTED] is the SOC that's going to tape

9 the [REDACTED] together in a single CPU

10 cluster and that's going to ship out to SOC. The

11 first tape out is not the commercial version. The

12 commercial tape out of the silicon will happen in

13 January time frame.

14 Q When you're referring to the tape out,

15 you're talking about the tape out of the [REDACTED] SOC?

16 A That's right.

17 Q And the [REDACTED] SOC will include a [REDACTED]

18 [REDACTED] core?

19 A That's right.

20 Q Is that true for all [REDACTED] SOC, they will

21 include both of those?

22 A [REDACTED] is a single SOC that's called

23 [REDACTED], and that would be this case.

24 Q Do you know offhand how many of the big

25 cores and how many of the medium cores are included

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1 in the [REDACTED] SOC?

2 A [REDACTED] has two big cores for mobile and

3 six medium cores.

4 Q You said the initial tape out of the

5 initial [REDACTED] SOC already occurred. When did that

6 occur?

7 A I believe it was July of last year.

8 Sorry, I'm still in '23. July of this year.

9 Q July of 2023 is when the initial tape out

10 for the [REDACTED] SOC occurred?

11 A That's right.

12 Q That SOC includes both the [REDACTED]

13 [REDACTED] ?

14 A That's right.

15 Q You mentioned a commercial tape out as

16 well?

17 A Yes.

18 Q When will that occur?

19 A Like I mentioned, it will be in the

20 January time frame.

21 Q January of 2024?

22 A That's right.

23 Q What's the difference between the initial

24 tape out and commercial tape out?

25 A Probably an engineering question, but we

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1 improve quality in various different respects on the

2 SOC.

3 Q Does Qualcomm have an expected time for

4 commercializing the [REDACTED] SOC?

5 A Yes.

6 Q What is that timing?

7 A We most likely will have products towards

8 the end of 2024 based on [REDACTED].

9 Q Does Qualcomm have a product name for the

10 [REDACTED] SOC?

11 A Public name?

12 Q Public name.

13 A Not at this time, but you can guess the

14 last one we launched was Snapdragon 8 and 3. It's

15 probably 10 and 4, but no public name.

16 Q It will likely be called Snapdragon?

17 A Snapdragon 4.

18 Q And the [REDACTED] SOC is for the mobile

19 market; is that correct?

20 A That is right.

21 Q Let me ask about the [REDACTED] core for the

22 [REDACTED] SOC. Is that currently in development?

23 A Yes, it is being developed.

24 Q You described that as a [REDACTED] mid

25 automotive core.

<p style="text-align: right;">Page 69</p> <p>1 A That's right.</p> <p>2 Q Is that the only core being developed for</p> <p>3 the [REDACTED] SOC?</p> <p>4 A From the CPU perspective, that would be</p> <p>5 the only core that's being developed.</p> <p>6 Q When did development of the [REDACTED] core</p> <p>7 for [REDACTED] start?</p> <p>8 A I don't remember the exact date.</p> <p>9 Q The team working on the [REDACTED] core for</p> <p>10 [REDACTED], does it include the former Nuvia</p> <p>11 engineers?</p> <p>12 A I believe it's the Qualcomm custom core</p> <p>13 team that basically has the team that came from</p> <p>14 acquisition.</p> <p>15 Q Has Qualcomm finished developing the</p> <p>16 [REDACTED] core for [REDACTED]?</p> <p>17 A I'm not sure, but it should be getting</p> <p>18 there fairly close, fairly soon.</p> <p>19 Q Has a tape out occurred?</p> <p>20 A No.</p> <p>21 Q Do you know if a tape out is planned for</p> <p>22 the [REDACTED] core for [REDACTED]?</p> <p>23 A Yes.</p> <p>24 Q When is that going to occur?</p> <p>25 A I believe it's in June of 2024.</p>	<p style="text-align: right;">Page 71</p> <p>1 talked about. A PC goes into a device. That size</p> <p>2 of smartphone that's in your hand, it should last a</p> <p>3 full day. An auto has a much larger battery, but</p> <p>4 auto places very specific requirements on the core</p> <p>5 development. You have to have certain capabilities</p> <p>6 for functional safety in automotive that are very</p> <p>7 restrictive also. So, all of these markets are very</p> <p>8 different in terms of what's needed for them.</p> <p>9 Q Just to make sure I asked this, are you</p> <p>10 aware at the technical level of any differences</p> <p>11 between the [REDACTED] core for the [REDACTED] SOC and the</p> <p>12 [REDACTED] core for the [REDACTED] SOC?</p> <p>13 MR. BRALY: Objection.</p> <p>14 THE WITNESS: Again, the question's for</p> <p>15 engineers, but like I mentioned before, the server</p> <p>16 market and PC market are vastly different.</p> <p>17 Requirements are very different between them.</p> <p>18 BY MR. MUINO:</p> <p>19 Q Let me ask you now about the [REDACTED]</p> <p>20 cores. You described the [REDACTED]</p> <p>21 [REDACTED] SOC; correct?</p> <p>22 A That's right.</p> <p>23 Q Are those cores in development currently?</p> <p>24 A That's right.</p> <p>25 Q Do you know when development on those</p>
<p style="text-align: right;">Page 70</p> <p>1 Q Does Qualcomm have an expected timing for</p> <p>2 commercializing the [REDACTED] SOC?</p> <p>3 A It should be after that date. Automotive</p> <p>4 time lines are a little bit longer than smartphones,</p> <p>5 but it should be after that date.</p> <p>6 Q Would that be sometime in 2025?</p> <p>7 A We'll, of course, start to provide samples</p> <p>8 to customers usually before that, but actual</p> <p>9 commercial products would come out later, so, yeah,</p> <p>10 we would probably get samples, commercial samples</p> <p>11 out to customers in '25.</p> <p>12 Q Is there a public-facing product name for</p> <p>13 the [REDACTED] SOC?</p> <p>14 A I don't -- I'm not aware of one at this</p> <p>15 time.</p> <p>16 Q At a technical level, are you aware of the</p> <p>17 differences between the [REDACTED] core for [REDACTED], for</p> <p>18 [REDACTED] and for [REDACTED]?</p> <p>19 MR. BRALY: Objection.</p> <p>20 THE WITNESS: It's a question best answered by</p> <p>21 the engineering team.</p> <p>22 BY MR. MUINO:</p> <p>23 Q To your knowledge, are there differences</p> <p>24 between those cores?</p> <p>25 A They're very different markets like I've</p>	<p style="text-align: right;">Page 72</p> <p>1 cores began?</p> <p>2 A I don't know the exact date.</p> <p>3 Q Do you know approximately?</p> <p>4 A You should think of it this way. Like I</p> <p>5 said, [REDACTED] a will have products at the end of '24.</p> <p>6 [REDACTED] we will have products end of '25. So this</p> <p>7 is the cadence we have on our smartphone products.</p> <p>8 We have to get a chip out every year and it needs to</p> <p>9 be better than the last one.</p> <p>10 Q But those two [REDACTED] cores, the large and</p> <p>11 medium, are in development currently?</p> <p>12 A Yes.</p> <p>13 Q The team working on the [REDACTED] cores,</p> <p>14 does it include the former Nuvia engineers?</p> <p>15 A It basically is the Qualcomm combined CPU</p> <p>16 team, which includes some of the acquisition and</p> <p>17 engineering as well.</p> <p>18 Q The [REDACTED] SOC, is that for the mobile</p> <p>19 market?</p> <p>20 A That's right.</p> <p>21 Q Has Qualcomm finished development of the</p> <p>22 [REDACTED]?</p> <p>23 A Again, it's a nebulous term, but the work</p> <p>24 is ongoing. We'll have the chip ready for</p> <p>25 commercial products end of '25.</p>

[REDACTED]

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1 Q Has there been a tape out for those cores?
 2 MR. BRALY: Objection.
 3 THE WITNESS: Not yet.
 4 BY MR. MUINO:
 5 Q Is there a tape out scheduled for the
 6 [REDACTED] ?
 7 MR. BRALY: Objection.
 8 THE WITNESS: Yes.
 9 BY MR. MUINO:
 10 Q When is that scheduled for?
 11 A Again, this is forward looking. Time
 12 lines change all the time. It's scheduled for, I
 13 believe, June of 2024.
 14 Q The [REDACTED] are
 15 compliant with Arm's version 9 architecture; is that
 16 correct?
 17 A These are V9 capable cores, yes.
 18 Q The [REDACTED] SOC hasn't been
 19 commercialized yet; correct?
 20 A No.
 21 Q Is there a timing for commercializing that
 22 SOC?
 23 A Like I mentioned, [REDACTED] will launch Q4 of
 24 '24, and the [REDACTED] will be in the
 25 market Q4 of '25.

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1 Q Does Qualcomm have a public-facing name
 2 for the [REDACTED] SOC?
 3 A Not at this time.
 4 Q Will that likely -- will it likely have a
 5 Snapdragon name?
 6 A Yes.
 7 Q Is that true for the [REDACTED] SOC as
 8 well? Will that likely have a Snapdragon name?
 9 A I believe so.
 10 Q Then you also mentioned the [REDACTED]
 11 [REDACTED] for the [REDACTED] r SOC. Is that
 12 currently in development at Qualcomm?
 13 A Yes.
 14 Q When did development on those cores begin?
 15 A I don't know the exact date.
 16 Q Has the development of those cores
 17 finished?
 18 A Not yet.
 19 Q Is there a scheduled time for a tape out
 20 of those cores?
 21 A Yes, there is.
 22 Q When is that?
 23 A I believe it's in Q3 of '24.
 24 Q The [REDACTED] SOC is for the PC market; is
 25 that correct?

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1 A It is for the PC.
 2 Q What is the expected timing for
 3 commercializing the [REDACTED] SOC?
 4 A It should basically be somewhere in '25.
 5 Q Is there a public-facing product name for
 6 the [REDACTED] SOC?
 7 A Not at this time.
 8 Q Will it likely have a Snapdragon name?
 9 A Yes.
 10 Q The [REDACTED], are
 11 those compliant with the Arm version 9 architecture?
 12 A They are V9 cores, that's right.
 13 MR. MUINO: I'd like to mark as the next
 14 exhibit, Exhibit 5, which is a document with the
 15 Bates label QCARM_275506. It's an e-mail from
 16 Mr. Asghar dated May 15, 2013.
 17 (Plaintiff's Exhibit 5 was marked for
 18 identification by the deposition officer and is
 19 attached hereto.)
 20 BY MR. MUINO:
 21 Q Mr. Asghar, I know this e-mail is from
 22 quite some time ago, but do you recognize this
 23 e-mail?
 24 A It has my name on it, so yes.
 25 Q You recognize this as an e-mail that you

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1 sent back in May 2013?
 2 A I guess so, yes.
 3 Q At this time in May 2013, I think your
 4 role was director of QCT strategy; is that correct?
 5 A Uh-huh, yes.
 6 Q And you say here that you're attaching the
 7 Arm analysis. Do you see that?
 8 A Yes.
 9 Q Do you recall what was the Arm analysis?
 10 A Honestly, I don't remember at this time.
 11 We analyze companies all the time, so...
 12 Q We will take a look at it. Do you see
 13 there's an attachment "Arm Strategy 050513"?
 14 A Yes.
 15 Q Let's take a look at that.
 16 A Sure.
 17 MR. MUINO: This will be Asghar Exhibit 6.
 18 It's a document that starts with the Bates number
 19 QCARM_0275507.
 20 (Plaintiff's Exhibit 6 was marked for
 21 identification by the deposition officer and is
 22 attached hereto.)
 23 BY MR. MUINO:
 24 Q Mr. Asghar, I'll represent this was the
 25 document that was produced behind the previous one

<p style="text-align: right;">Page 133</p> <p>1 this time in January 2021; correct?</p> <p>2 A Yes.</p> <p>3 Q Those were CPUs that Nuvia had developed</p> <p>4 prior to its acquisition; right?</p> <p>5 MR. BRALY: Objection; calls for speculation.</p> <p>6 THE WITNESS: Again, it's very clear to anybody</p> <p>7 who is in this area that he does not mean exactly</p> <p>8 the same CPUs, because if you made a smartphone with</p> <p>9 a server CPU, it would last five minutes and burn a</p> <p>10 hole in your hand. I think anybody who is aware</p> <p>11 knows what he means by this, that we would develop</p> <p>12 custom cores for these markets. You cannot take a</p> <p>13 server CPU into a smartphone. Your phone would</p> <p>14 literally last a few minutes.</p> <p>15 BY MR. MUINO:</p> <p>16 Q Let's try to focus, Mr. Asghar, on what</p> <p>17 I'm asking. I'm not asking about what Qualcomm did</p> <p>18 subsequently, I'm asking about what was being</p> <p>19 acquired through the acquisition of Nuvia. Nuvia</p> <p>20 had developed some CPU cores, right; is that</p> <p>21 correct?</p> <p>22 A Yes.</p> <p>23 Q And specifically the core that they had</p> <p>24 developed was called [REDACTED]; right?</p> <p>25 A For servers, yes.</p>	<p style="text-align: right;">Page 135</p> <p>1 when it acquired Nuvia was the Nuvia [REDACTED] core;</p> <p>2 correct?</p> <p>3 MR. BRALY: Objection; asked and answered.</p> <p>4 THE WITNESS: Yes.</p> <p>5 BY MR. MUINO:</p> <p>6 Q What Mr. Amon is saying here is "We expect</p> <p>7 to integrate the Nuvia CPUs across Qualcomm's</p> <p>8 portfolio of products"; correct?</p> <p>9 A That's what he's saying, but this is not</p> <p>10 something that you should look at as exactly the</p> <p>11 same CPU. Like I'm explaining from a technology</p> <p>12 perspective, you cannot do that. So the audience is</p> <p>13 well aware of the fact that this will be newly</p> <p>14 defined, newly designed CPUs that would be very</p> <p>15 different in nature to be able to meet the</p> <p>16 requirements of these different product lines.</p> <p>17 Q That's not what Mr. Amon says in this</p> <p>18 e-mail; right?</p> <p>19 MR. BRALY: Objection; mischaracterizes the</p> <p>20 document.</p> <p>21 BY MR. MUINO:</p> <p>22 Q Is that right?</p> <p>23 A I'm telling you, you can ask anybody --</p> <p>24 pick out any of the Qualcomm.all and ask them what</p> <p>25 this means. They will say it could not be the same</p>
<p style="text-align: right;">Page 134</p> <p>1 Q That was a core for the [REDACTED] SOC;</p> <p>2 correct?</p> <p>3 A That's right.</p> <p>4 Q The [REDACTED] SOC was for the server market;</p> <p>5 is that right?</p> <p>6 A That's right.</p> <p>7 Q So that [REDACTED] core was part of what</p> <p>8 Qualcomm was acquiring when it acquired Nuvia;</p> <p>9 right?</p> <p>10 MR. BRALY: Objection.</p> <p>11 THE WITNESS: We were acquiring the entire</p> <p>12 Nuvia team. Yes.</p> <p>13 BY MR. MUINO:</p> <p>14 Q I'm not asking about the team. Part of</p> <p>15 what Qualcomm was acquiring when it acquired Nuvia</p> <p>16 was the Nuvia [REDACTED] core; correct?</p> <p>17 MR. BRALY: Objection.</p> <p>18 THE WITNESS: Yes. All the assets came along,</p> <p>19 yes, but this statement is talking about future</p> <p>20 product plans. I think that should be quite clear,</p> <p>21 right? We expect to integrate such that we are</p> <p>22 clear on that.</p> <p>23 BY MR. MUINO:</p> <p>24 Q But, again, I just -- I think you answered</p> <p>25 my question. Part of what Qualcomm was acquiring</p>	<p style="text-align: right;">Page 136</p> <p>1 CPU because the server CPU is vastly different than</p> <p>2 the CPU that goes into a smartphone. That's why we</p> <p>3 were negotiating with them to create a different CPU</p> <p>4 for us because we knew a server CPU cannot go into a</p> <p>5 smartphone. So what he's saying over there is</p> <p>6 Qualcomm cores, Qualcomm CPUs will be designed to go</p> <p>7 into these markets.</p> <p>8 Q It was Qualcomm's intent to use the</p> <p>9 [REDACTED] core that Nuvia had developed, correct,</p> <p>10 after the acquisition?</p> <p>11 MR. BRALY: Objection.</p> <p>12 THE WITNESS: It was Qualcomm's intent to use</p> <p>13 the Qualcomm custom core team to design different</p> <p>14 custom cores for these very different markets than</p> <p>15 what Nuvia was working on.</p> <p>16 BY MR. MUINO:</p> <p>17 Q Was Qualcomm planning to throw away the</p> <p>18 [REDACTED] core that Nuvia had developed?</p> <p>19 MR. BRALY: Objection.</p> <p>20 THE WITNESS: As we discussed earlier, there</p> <p>21 was an [REDACTED] product which we as a company could</p> <p>22 choose to continue or not, but it would exist in</p> <p>23 that SOC. For these other markets, smartphone, PC,</p> <p>24 XR, automotive, we would need new cores.</p> <p>25 ///</p>

<p style="text-align: right;">Page 169</p> <p>1 at this time? Do you know?</p> <p>2 A I don't know. If they were deactivated, I</p> <p>3 think they probably wouldn't be able to access it, I</p> <p>4 suppose.</p> <p>5 Q And do you know at this point if the</p> <p>6 former Nuvia employees switched over to using</p> <p>7 Qualcomm credentials?</p> <p>8 A I think once we got the notice, I'm</p> <p>9 assuming we passed it on to the relevant teams and</p> <p>10 they, of course, abided by it, but basically saying</p> <p>11 these are all Qualcomm teams at this point, which is</p> <p>12 true.</p> <p>13 Q If you look at the third line, the</p> <p>14 sentence starting -- the second half of the third</p> <p>15 line says:</p> <p>16 [REDACTED]</p> <p>24 Do you see that?</p> <p>25 A I do.</p>	<p style="text-align: right;">Page 171</p> <p>1 (Plaintiff's Exhibit 18 was marked for</p> <p>2 identification by the deposition officer and is</p> <p>3 attached hereto.)</p> <p>4 MR. MUINO: I'm sorry, the text is so small.</p> <p>5 Let's put this one aside. Let me see if I can get a</p> <p>6 better copy.</p> <p>7 THE WITNESS: Sure.</p> <p>8 MR. MUINO: The next one has the same problem.</p> <p>9 Okay, let's mark as Exhibit 19 a document that has</p> <p>10 the label QCARM_27987.</p> <p>11 (Plaintiff's Exhibit 19 was marked</p> <p>12 for identification by the deposition officer and is</p> <p>13 attached hereto.)</p> <p>14 BY MR. MUINO:</p> <p>15 Q Mr. Asghar, do you see this is a letter</p> <p>16 from Paul Williamson to you dated February 2nd,</p> <p>17 2021?</p> <p>18 A Yes.</p> <p>19 Q And you recognize this letter?</p> <p>20 A Yes, I do.</p> <p>21 Q The first sentence says:</p> <p>22 "Thank you for your letter</p> <p>23 dated January 27, 2021 regarding the</p> <p>24 acquisition of Nuvia, Inc. ('NUVIA')</p> <p>25 by Qualcomm Technologies, Inc.</p>
<p style="text-align: right;">Page 170</p> <p>1 Q Do you recall if that actually occurred,</p> <p>2 that the Nuvia credentials were deactivated?</p> <p>3 A I'm not sure, but I suppose so.</p> <p>4 Q At this point in time in May 2021, were</p> <p>5 Arm and Qualcomm discussing terms by which the Nuvia</p> <p>6 design and related Arm IP could be transferred to</p> <p>7 Qualcomm?</p> <p>8 MR. BRALY: Objection.</p> <p>9 THE WITNESS: We were discussing on basically</p> <p>10 using Qualcomm ALA to be able to design our cores</p> <p>11 and how that was the overarching document.</p> <p>12 BY MR. MUINO:</p> <p>13 Q That was an ongoing discussion you were</p> <p>14 having with Arm?</p> <p>15 A With Paul and Will at that time.</p> <p>16 Q Will is Will Abbey?</p> <p>17 A That's right.</p> <p>18 Q Were you the one at Qualcomm leading those</p> <p>19 discussions?</p> <p>20 MR. BRALY: Objection.</p> <p>21 THE WITNESS: We were -- RK and I were involved</p> <p>22 in those discussions, but there were other people</p> <p>23 working in the background.</p> <p>24 MR. MUINO: I'm going to mark as Exhibit 18 a</p> <p>25 document that has the Bates label 3450805.</p>	<p style="text-align: right;">Page 172</p> <p>1 ('QTI')."</p> <p>2 Do you see that?</p> <p>3 A Yes.</p> <p>4 Q You understood this was Mr. Williamson</p> <p>5 responding to your earlier letter?</p> <p>6 A Yes.</p> <p>7 Q The second paragraph says:</p> <p>8 [REDACTED]</p> <p>22 Do you see that?</p> <p>23 A I see that.</p> <p>24 Q Now, by this point in time you understood</p> <p>25 that Qualcomm and Nuvia each had agreements, license</p>

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1	DEPOSITION ERRATA SHEET
2	Page No. ____ Line No. ____ Change to: _____
3	_____
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5	Page No. ____ Line No. ____ Change to: _____
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16	Reason for change: _____
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19	Reason for change: _____
20	Page No. ____ Line No. ____ Change to: _____
21	_____
22	Reason for change: _____
23	_____
24	SIGNATURE: _____ DATE: _____
25	Witness _____



EXHIBIT 9

**LYNN BOS Highly Confidential - AEO
ARM, LTD. vs QUALCOMM, INC.**

November 29, 2023

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Page 1	Page 3
<p>1 IN THE UNITED STATES DISTRICT COURT</p> <p>2 FOR THE DISTRICT OF DELAWARE</p> <p>3 ARM LTD., a U.K.) corporation,)</p> <p>4) Case No.: C.A. No. Plaintiff,) 22-1146-MN</p> <p>5)</p> <p>6 vs.)</p> <p>7 QUALCOMM, INC., a) Delaware corporation, et) al.,)</p> <p>8) Defendants.)</p> <p>9 _____)</p> <p>10</p> <p>11</p> <p>12 HIGHLY CONFIDENTIAL: ATTORNEYS' EYES ONLY</p> <p>13 VIDEOTAPED DEPOSITION OF LYNN BOS</p> <p>14 755 Page Mill Road</p> <p>15 Palo Alto, California 94304</p> <p>16 November 29, 2023</p> <p>17 9:02 a.m.</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24 REPORTED BY:</p> <p>25 Tammy Moon, CSR No. 13184, RDR, CRR</p>	<p>1 INDEX TO EXAMINATION</p> <p>2 LYNN BOS</p> <p>3 Wednesday, November 29, 2023</p> <p>4 Tammy Moon CSR No. 13184, RPR, CRR</p> <p>5 WITNESS: LYNN BOS</p> <p>6</p> <p>7 EXAMINATION PAGE</p> <p>8 MR. LI: 7, 144</p> <p>9 MS. NYARADY: 142, 149</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
Page 2	Page 4
<p>1 APPEARANCES:</p> <p>2 FOR PLAINTIFF ARM LTD., a U.K. corporation:</p> <p>3 MORRISON FOERSTER</p> <p>4 BY: JACK (RUOHAN) LI, ESQ. 2100 L St., NW, Ste 900 Washington, D.C. 20037 202.887.1562 Jackli@mofo.com</p> <p>6</p> <p>7 FOR DEFENDANT QUALCOMM, INC., a Delaware corporation:</p> <p>8</p> <p>9 PAUL, WEISS, RIFKIND, WHARTON & GARRISON LLP</p> <p>10 BY: CATHERINE NYARADY, ESQ. BY: JACOB BRALY, ESQ. 1285 Avenue of the Americas New York, New York 10019 212.373.3726 Cnyarady@paulweiss.com</p> <p>12</p> <p>13 FOR DEFENDANT QUALCOMM:</p> <p>14 QUALCOMM</p> <p>15 BY: KURT KJELLAND, ESQ. 5775 Morehouse Dr. San Diego, California 92121-1714 858.651.5423 Kurtk@qualcomm.com</p> <p>17</p> <p>18 ALSO PRESENT: KEVIN MCMAHON, THE VIDEOGRAPHER</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 INDEX TO EXHIBITS</p> <p>2 LYNN BOS</p> <p>3 Wednesday, November 29, 2023</p> <p>4 Tammy Moon CSR No. 13184, RPR, CRR</p> <p>5 MARKED DESCRIPTION PAGE</p> <p>6 Exhibit 1 Arm's First Notice of Deposition 14 of Qualcomm and Qualcomm Technologies, Inc.</p> <p>8</p> <p>9 Exhibit 2 Arm Ltd.'s First Notice of 18 Deposition of Nuvia, Inc. Pursuant to Federal Rule of Civil Procedure 30(b)(6)</p> <p>12</p> <p>13 Exhibit 3 Lynn Bos' LinkedIn page 20</p> <p>14 Exhibit 4 Bates-stamped page QCARM_0025780 34</p> <p>15 Exhibit 5 Bates-stamped page QCARM_7422237 59</p> <p>16 Exhibit 6 Bates-stamped pages 61 QCARM_0024011-QCARM_0024016</p> <p>17</p> <p>18 Exhibit 7 Bates-stamped pages 71 QCARM_0007285-QCARM_0007286</p> <p>19</p> <p>20 Exhibit 8 Bates-stamped pages 93 QCARM_3389968-QCARM_3389970</p> <p>21</p> <p>22 Exhibit 9 Bates-stamped pages 101 QCARM_3312272-QCARM_3312274</p> <p>23</p> <p>24</p> <p>25</p>

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<p>1 INDEX TO EXHIBITS</p> <p>2 LYNN BOS</p> <p>3 Wednesday, November 29, 2023</p> <p>4 Tammy Moon CSR No. 13184, RPR, CRR</p> <p>5 Exhibit 10 Bates-stamped pages 103</p> <p>6 QCARM_3304664-QCARM_3304669</p> <p>7 Exhibit 11 Bates-stamped pages 104</p> <p>8 QCARM_3312122-QCARM_3312123</p> <p>9 Exhibit 12 Bates-stamped pages 109</p> <p>10 QCARM_2403551-QCARM_2403553</p> <p>11 Exhibit 13 Bates-stamped page QCARM_0360587 115</p> <p>12 Exhibit 14 Email from Madalyn Vaughn to Jack 122</p> <p>13 Li, and others, dated August 15,</p> <p>14 2023</p> <p>15 Exhibit 15 Arm Ltd.'s Set of Interrogatories 123</p> <p>16 to Defendants Qualcomm Inc.,</p> <p>17 Qualcomm Technologies, Inc., and</p> <p>18 Nuvia, Inc. (No.s 1-13)</p> <p>19 Exhibit 16 Document 143</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>Page 5</p> <p>1 LYNN BOS,</p> <p>2 called as a witness, having been duly sworn,</p> <p>3 testified as follows:</p> <p>4 THE WITNESS: Yes.</p> <p>5 THE VIDEOGRAPHER: Please proceed.</p> <p>6 MS. NYARADY: And I should add I also</p> <p>7 represent the witness.</p> <p>8 DIRECT EXAMINATION BY MR. LI</p> <p>9 MR. LI:</p> <p>10 Q. Morning, Ms. Bos. Could you please state</p> <p>11 your name for the record, please.</p> <p>12 A. My full name?</p> <p>13 Q. Yes.</p> <p>14 A. Yes. Lynn Marie Natalie Bos.</p> <p>15 Q. Thank you. And what is your current</p> <p>16 address?</p> <p>17 A. 1128 Spinosa Drive, Sunnyvale, California</p> <p>18 94087.</p> <p>19 Q. And are you currently employed by Qualcomm?</p> <p>20 A. Correct.</p> <p>21 Q. What is your current position?</p> <p>22 A. Program manager.</p> <p>23 Q. And have you had your deposition taken</p> <p>24 before?</p> <p>25 A. No. This is my first time.</p>
<p>Page 6</p> <p>1 Wednesday, November 29, 2023, 9:02 a.m.</p> <p>2 THE VIDEOGRAPHER: Good morning. We are on</p> <p>3 the video record on November 29th, 2023. The time</p> <p>4 is 9:02 a.m. My name is Kevin McMahon. I am the</p> <p>5 legal videographer. And the court reporter today is</p> <p>6 Tammy Moon. We are both here representing Esquire</p> <p>7 Deposition Solutions.</p> <p>8 This is the beginning of Media Unit 1 for</p> <p>9 the deposition of Lynn Bos in the matter of Arm,</p> <p>10 Ltd., v. Qualcomm, Inc., venued in the United States</p> <p>11 District Court, for the District of Delaware. The</p> <p>12 case number is 22-1146-MN.</p> <p>13 We are located today at Morrison Foerster,</p> <p>14 755 Page Mill Road, Palo Alto, California 94303.</p> <p>15 Counsel, will you please identify</p> <p>16 yourselves for the record. Let's start with the</p> <p>17 noticing attorney.</p> <p>18 MR. LI: Jack Li on behalf of plaintiff,</p> <p>19 Arm.</p> <p>20 MS. NYARADY: Catherine Nyarady from Paul,</p> <p>21 Weiss on behalf of the defendants. And I'm joined</p> <p>22 by Jake Braly -- also of Paul, Weiss -- and Kurt</p> <p>23 Kjelland from Qualcomm.</p> <p>24 THE VIDEOGRAPHER: The court reporter may</p> <p>25 now swear in the witness.</p>	<p>Page 7</p> <p>Page 8</p> <p>1 Q. Okay. And have you ever testified in court</p> <p>2 before?</p> <p>3 A. No.</p> <p>4 Q. Okay. Since you have never had your</p> <p>5 deposition taken before, I just want to run through</p> <p>6 some quick rules. The big main thing is that the</p> <p>7 court reporter will need to record what we're</p> <p>8 saying.</p> <p>9 To make sure the court reporter can hear us</p> <p>10 clearly, I will just ask that you wait until I</p> <p>11 finish my question before you start answering. And</p> <p>12 in turn, I will, of course, wait for you to finish</p> <p>13 answering before I ask my next question. Is that</p> <p>14 okay?</p> <p>15 A. Okay.</p> <p>16 Q. Okay. And then from time to time, your</p> <p>17 counsel might object to my questions. But unless</p> <p>18 your counsel instructs you not to answer, you will</p> <p>19 still need to answer the question. Do you</p> <p>20 understand?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. And I normally take a break about</p> <p>23 every hour. But if you need a break in between, as</p> <p>24 long as we're not in the middle of a question, we</p> <p>25 can also accommodate that. You can just let me know</p>

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1 access to that [REDACTED] ?

2 MS. NYARADY: Objection.

3 THE WITNESS: I -- I don't know. Yeah.

4 MR. LI:

5 Q. So who had access to that [REDACTED]

6 that came with Nuvia to Qualcomm?

7 MS. NYARADY: Objection. Asked and

8 answered.

9 THE WITNESS: Yeah.

10 MR. LI:

11 Q. Do you know who had access to that [REDACTED]

12 [REDACTED] ?

13 MS. NYARADY: Same objection.

14 THE WITNESS: So those access lists were

15 not managed by me. I don't know who was on those

16 access lists.

17 MR. LI:

18 Q. Generally speaking, do you have any

19 understanding as to who will be on that access list?

20 A. The engineers that need to work on the

21 [REDACTED] would have access.

22 Q. Which engineers would need to work on that

23 [REDACTED] ?

24 A. The ones that developed RTL code or

25 verified it or the physical design.

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1 Q. When you say "the physical design," the RTL

2 codes -- are you referring to any specific products

3 within Qualcomm or just generally all RTL codes or

4 physical designs?

5 A. I thought you were asking me about who had

6 access to the [REDACTED] .

7 Q. Yes.

8 A. Is that correct?

9 Q. That's correct, yes.

10 A. Okay. So I would think that the people

11 that had access were people working on the [REDACTED]

12 products or the custom CPU. Yeah.

13 Q. Okay. And people who were working on the

14 custom CPU, are those people all ex-Nuvia employees?

15 A. Mostly. We did continue to hire people

16 even when we -- I mean, after -- after the

17 acquisition.

18 Q. Were there any employees that were already

19 at Qualcomm when Nuvia was acquired by Qualcomm who

20 was now working on the custom CPU team?

21 A. Are you asking if Qualcomm employees that

22 were a Qualcomm employee before the Nuvia

23 acquisition -- if they have joined our team after

24 the acquisition --

25 Q. Yes.

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1 A. -- to work on custom CPU --

2 Q. Correct.

3 A. -- or [REDACTED] ? Yes.

4 Q. Do you --

5 A. Some people have transferred.

6 Q. Do you know how many people were

7 transferred from Qualcomm to the custom CPU team

8 when Nuvia was acquired?

9 A. No.

10 Q. Was it five people, more or less?

11 MS. NYARADY: Objection.

12 THE WITNESS: I can't say with certainty

13 how many.

14 MR. LI:

15 Q. Okay. How many people are on the custom

16 CPU team? Do you know?

17 A. Now?

18 Q. Mm-hmm.

19 A. Let me -- let me think. I cannot say with

20 certainty, again, because it changes quickly. Under

21 the custom CPU team, I would think 400, 500,

22 something like that. But I cannot say that with

23 certainty.

24 Q. And the files that were in the [REDACTED]

25 [REDACTED] , are they on the [REDACTED]

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1 [REDACTED] now?

2 A. Any document -- I mean, let me tell you

3 my -- let me explain you my pause.

4 Q. Please.

5 A. I would think that most documents have

6 transferred, yeah. I -- yeah.

7 Q. Okay. And who will have access to those

8 files on the [REDACTED] now?

9 A. The people that are part of the custom CPU

10 and -- yeah, custom CPU team. Yes. Yeah.

11 Q. Would anyone else have access to that file?

12 A. People that are truly part of our

13 organization. Or sometimes there are people that

14 have been assigned, like, indefinitely to our team.

15 But sometimes they don't report in to Gerard. There

16 are just very few individuals, but that has

17 happened.

18 Q. I see. And when you say "people who are

19 not part of our organization," by "organization," do

20 you mean the custom CPU team?

21 A. Yeah. That didn't report in to Gerard's --

22 yeah.

23 Q. Got it. Do you know who those people

24 reported to?

25 A. No, no. I actually realize that -- so the

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Page 153	Page 155
<p>1 DEPOSITION ERRATA SHEET</p> <p>2</p> <p>3</p> <p>4 Our Assignment No. J10593039</p> <p>5 Case Caption: ARM LTD.</p> <p>6 vs. QUALCOMM, INC.</p> <p>7</p> <p>8 DECLARATION UNDER PENALTY OF PERJURY</p> <p>9 I declare under penalty of perjury</p> <p>10 that I have read the entire transcript of</p> <p>11 my Deposition taken in the captioned matter</p> <p>12 or the same has been read to me, and</p> <p>13 the same is true and accurate, save and</p> <p>14 except for changes and/or corrections, if</p> <p>15 any, as indicated by me on the DEPOSITION</p> <p>16 ERRATA SHEET hereof, with the understanding</p> <p>17 that I offer these changes as if still under</p> <p>18 oath.</p> <p>19 Signed on the _____ day of</p> <p>20 _____, 20____.</p> <p>21</p> <p>22 _____</p> <p>23 LYNN BOS</p> <p>24</p> <p>25</p>	<p>1 DEPOSITION ERRATA SHEET</p> <p>2 Page No. _____ Line No. _____ Change to: _____</p> <p>3 _____</p> <p>4 Reason for change: _____</p> <p>5 Page No. _____ Line No. _____ Change to: _____</p> <p>6 _____</p> <p>7 Reason for change: _____</p> <p>8 Page No. _____ Line No. _____ Change to: _____</p> <p>9 _____</p> <p>10 Reason for change: _____</p> <p>11 Page No. _____ Line No. _____ Change to: _____</p> <p>12 _____</p> <p>13 Reason for change: _____</p> <p>14 Page No. _____ Line No. _____ Change to: _____</p> <p>15 _____</p> <p>16 Reason for change: _____</p> <p>17 Page No. _____ Line No. _____ Change to: _____</p> <p>18 _____</p> <p>19 Reason for change: _____</p> <p>20 Page No. _____ Line No. _____ Change to: _____</p> <p>21 _____</p> <p>22 Reason for change: _____</p> <p>23</p> <p>24 SIGNATURE: _____ DATE: _____</p> <p>25 LYNN BOS</p>
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EXHIBIT 10

HIGHLY CONFIDENTIAL - SOURCE CODE - ATTORNEY'S EYES ONLY

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

OPENING EXPERT REPORT OF DR. MURALI ANNAVARAM

December 20, 2023

HIGHLY CONFIDENTIAL – SOURCE CODE - ATTORNEY’S EYES ONLY**TABLE OF CONTENTS**

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II. INTRODUCTION

1. My name is Murali Annavaram. I have been retained as an expert in this action on behalf of Defendants Qualcomm Inc., Qualcomm Technologies (collectively, “Qualcomm”), and Nuvia, Inc. (“Nuvia”) (together, “Defendants”). I am being compensated for my work on this case at my standard consulting rate of \$600 per hour. I am also being reimbursed for expenses that I may incur. My compensation is not contingent upon the results of my analysis or the substance of my opinions or testimony.

A. Summary of Opinions

2. For this report, I have been asked to analyze the materials discussed in this report and offer my expert opinions on the reasonableness of Qualcomm’s process to identify and remove Nuvia-sourced ARM RTL and related test and debug code¹ from certain Qualcomm codebases. For reasons described further below, I will refer to this process as the “Swap Out.” RTL stands for register transfer language, a well-known programming abstraction for describing the functionality of a chip. By “Nuvia-sourced ARM RTL,” I mean ARM RTL downloaded by Nuvia under Nuvia’s license through ARM Connect using Nuvia credentials.

3. I submit this report to describe my opinions related to the Swap Out. For background, I provide a technology overview, including Register-Transfer Level code (RTL) and how processors and system-on-chips (“SoCs”) are developed and represented in RTL. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹ The source code discussed in this Report is predominantly RTL (e.g. file extensions, .v, .sv or .svh). Even though there are instances where the source code is not what would be classified as RTL, I will generally reference the source code in this Report as RTL unless otherwise noted.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4. After ARM terminated Nuvia's license, it is my understanding that Qualcomm undertook efforts to identify and remove all Nuvia-sourced ARM RTL from Qualcomm Codebases. My opinion, based on my expertise in processor design, is that Qualcomm designed and implemented a thorough process to identify Nuvia-Sourced ARM RTL in the Qualcomm Codebases based on my review of the materials discussed below, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

B. Reservations

5. I expect to be called to provide expert testimony regarding opinions formed resulting from my analysis of the issues considered in this report if asked about those issues by the

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court or by the private parties' attorneys. If called to testify, I may use demonstratives to explain the concepts and issues discussed below. I may also use various documents produced in this case that refer to or relate to the matters discussed in this report to present my opinions. I may also discuss my own work, teaching, and publications in the field, and knowledge of the state of the art in the relevant time period. I may rely on handbooks, textbooks, technical literature, my own personal experience in the field, and other relevant materials and/or information to demonstrate the state of the art in the relevant period and the evolution of relevant technologies.

6. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, after considering new positions set forth by ARM LTD. ("ARM"). For example, I may update my opinions based on additional opinions that ARM's experts may present and information I may receive in the future or additional work I may perform in connection with these opinions and information.

7. It is my understanding that discovery is still ongoing. For example, I understand that the parties are still taking depositions, and completing discovery, which may result in updating written discovery. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, based on any documents, testimony, or other evidence that may emerge during the course of this matter.

8. It is also my understanding that ARM may submit an expert report corresponding to this report. I reserve the right to rebut any positions taken in that report.

III. QUALIFICATIONS AND BACKGROUND

9. My curriculum vitae ("CV") is attached as Appendix A and provides a summary of my background, education, and professional experience.

10. I am an expert in the field of SoC, CPU and GPU architecture and microarchitecture, mobile systems, and datacenter computing. My research focuses on designing

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energy efficient and high performance chip multiprocessors (CMPs), server computer systems, mobile SoCs, microarchitectural innovations and instruction set architecture (ISA) enhancements, RTL based modeling and simulations of SoC, CPU and GPU microarchitectural blocks, verification and testing of hardware designs, software based simulation of SoC and processor components to perform wide range design space tradeoff analysis, compiler schemes for translating high level language applications into efficient instructions mapped to the underlying processor ISA, interconnection network architectures, reliability of computing platforms, and superconducting computer architecture. I have done many of these studies both in industry and academia.

11. I have been a faculty member at the Ming-Hsieh Department of Electrical and Computer Engineering, with a joint appointment in the Computer Science department at the University of Southern California since 2007. I currently hold the Lloyd Hunt Chair Professorship at USC. In the past I held the position of Dean's Professor until June 2023, and Robert G. and Mary G. Lane Early Career Chair until Aug 2017. I also held the Rukmini Gopalakrishnachar visiting chair at the Indian Institute of Science.

12. I co-authored Parallel Computer Organization and Design, a widely-used textbook for graduate-level computer architecture courses, which addresses the design of modern high-performance CPUs and prepares students for a career designing the computer systems of the future. I teach several undergraduate and graduate computer architecture courses at USC, including topics such as CPU and GPUs microarchitecture, server and cloud computing, mobile and edge computing systems, systems for machine learning, and memory system design. These classes have included EE109 – Introduction to Embedded Systems, EE557 – Advanced Computer Architecture, EE653 – Advanced Topics in Microarchitecture, and other special topic courses.

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13. Prior to joining USC, I spent nearly 7 years at Intel as a senior research staff member. At Intel, I worked on a broad range of topics including processor microarchitecture techniques to improve power-performance tradeoffs, efficient coherence and consistency models for chip multiprocessors (CMPs), 3D stacked memory technologies, energy per instruction (EPI) throttling schemes, database performance optimizations on Intel architectures, and the impact of process variations on CPU's timing analysis. I spent a year at Nokia as a visiting scientist working on mobile SoCs, including studying the tradeoffs between compute, sensing and communication in SoCs.

14. I received my Bachelor of Technology degree in Computer Science from the National Institute of Technology in Warangal, India, in 1993, and my Master of Science degree in Computer Science and Engineering from Colorado State University in 1996. I received my Ph.D. degree in Computer Science and Engineering from The University of Michigan in 2001.

15. I have published over 100 well-cited research papers with a total citation count exceeding 8600. My work on CPU design using 3D die stacking, energy efficient computing on CMPs through EPI throttling, and energy efficient sensing and computing in SoCs have each been cited over 300 times.

16. I have received numerous awards including, for example, the IBM Faculty Partnership award in 2008, the Best Paper Award at the 2009 IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), and the National Science Foundation CAREER award in 2010.

17. I was named an IEEE fellow for my contributions to heterogeneous architectures for energy-efficient computing systems. I am a Distinguished Member of the Association of Computing Machinery (ACM).

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18. My research has been published at the major computing conferences in the field of computer architecture, including the International Symposium on Computer Architecture (ISCA), the High-Performance Computer Architecture (HPCA), and the Symposium on Microarchitecture (MICRO).

19. My research on server energy efficiency has been selected for the IEEE Micro TopPicks award for the most influential computer architecture paper of the year 2013. I have given keynote presentations at the Swedish Multicore Symposium in 2018 and at the IEEE International On-Line Test Symposium in 2014. My group's research won Best Paper and Best Student paper finalist nominations at the Supercomputing 2019 conference. I was the Frontiers in Technology Distinguished Speaker at UC Merced during 2022.

20. For my research and publications in this field, I was inducted into the ACM Special Interest Group on Microarchitecture Hall of Fame in December 2015. I am one of only 47 researchers over the past 48 years at that time to receive this honor. I was also inducted into the IEEE Computer Society Technical Committee on Computer Architecture's High Performance Computer Architecture Hall of Fame. I am one of only 42 researchers over the past 22 years at that time to receive this honor. Finally, I was inducted into the ACM International Symposium on Computer Architecture (ISCA) Hall of Fame in June 2017. I am one of only 81 researchers to have received this honor over the past 44 years at the time of the award.

21. I served as the General Co-Chair for ISCA 2018 and served as the Technical Program Chair for HPCA 2021. I am going to serve as a Technical Program Chair of the International Conference on Supercomputing, 2024. I have also served as a program committee member for several international conferences and symposiums, including ISCA, MICRO, HPCA, SIGMETRICS, DSN, HiPC, and ASPLOS.

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22. I served as an associate editor for the technical journal of the Association for Computer Machinery Transactions on Design Automation of Electronic Systems (ACM TODAES), and I served as a journal reviewer for the ACM Transactions on Computer Systems (ACM TOCS), ACM Transactions on Embedded Computing Systems (ACM TECS), ACM Computing Surveys, ACM Transactions on Architecture and Code Optimization (ACM TACO), and IEEE Top Picks in Microarchitecture 2010.

23. I am an inventor or co-inventor of several issued patents.

24. I have graduated 15 PhD students at USC, and 11 of them were solely advised by me. Of these, 6 are now in academia (both in the USA and abroad) as professors working on various computer architecture related problems.

25. My Research Lab at USC is nicknamed SCIP (Super Computing In Pocket). SCIP research areas include: energy efficiency through heterogeneous computing; reliability of high-performance computing; bandwidth efficient big data computing; runtime systems design to enable dispersed computing; hardware-assisted secure and private machine learning; and building innovative sensor data collection platforms to improve human performance. SCIP engages with researchers in industry and academia to tackle compelling computer system challenges.

26. I am also the inaugural director of the USC-Meta Center for Research and Education in AI and Learning (REAL@USC-Meta Center). REAL@USC advances foundations for cooperative algorithmic optimization, hardware innovations for AI, and AI education accessibility.

27. My research group has published more than 30 papers on the topic of CPU and GPU microarchitecture alone at top-tier computer architecture conferences in the past 10 years, where the typical acceptance rates are less than 20%. In particular, my group published 3 papers

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at the flagship computer architecture conference ISCA during 2016, which is a record for the highest number of published papers by a single research group.

28. My research group has designed and evaluated the energy efficient techniques for mobile systems, including the KNOWME wireless body area sensor networks, energy efficient management of sensor subsystems on mobile phones, and privacy preserving traffic monitoring from mobile devices.

29. My group has done extensive experimentation and analysis of our proposed research ideas using a wide range of instruction set architecture enhancements, microarchitecture block designs of CPUs and GPUs, operating system modifications, system-level hardware modifications, and design enhancements. We routinely work with RTL modules, instruction set architectures (ISAs), test and verification tools, software and RTL simulation infrastructures.

IV. BASIS FOR OPINIONS

30. My qualifications are summarized in Section III of this report. My full curriculum vitae is attached as Appendix A to this report.

31. As part of my preparation for writing this report, I reviewed the materials listed in Appendix B to this report. These materials include, but are not limited to, the following: spreadsheets and scripts responsible for identifying Nuvia-sourced ARM RTL or other related code, scripts for the removal of related information, deposition transcripts, and copies of the documents described in this report.

32. I also reviewed RTL in Qualcomm Codebases that was produced in this litigation. For that code review, I accessed codebases for multiple snapshots of RTL during my time reviewing code at the Prosearch source code review location in Los Angeles, CA. I provide further description of this code in my analysis below.

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33. I further had several discussions with Qualcomm engineers Nick Jones (Director of Engineering, Qualcomm) and Bob Pflederer (Senior Director, Qualcomm) regarding the Swap Out, who were both substantially involved in the process.

V. TECHNOLOGY BACKGROUND

34. In what follows, I will provide an overview of processor technology and RTL representation used in microarchitectures.

A. Processor Technology

35. A System-on-Chip or SoC design places a variety of components such as processors, caches, memories, and input/output devices all on a single piece of silicon. Such a design offers both reduced latency for executing an application and reduced power consumption than a design in which the various components are placed on separate chips. One reason for improved SoC power efficiency and performance is that the components on the SoC can communicate with each other using on-chip wires that have lower resistance than off-chip pins. SoCs also enable integration of heterogeneous technologies such as central processing unit (CPU), graphics processing unit (GPU), volatile memory such as DRAM that holds application programs when they are executing, and non-volatile storage such as Flash memory that holds applications and other media files even when the device is turned off.

36. One of the components typically included on a SoC is one or more Central Processing Unit (CPU) cores. Each CPU core may include components or blocks such as a data cache, an instruction cache, an Arithmetic Logic Unit (ALU), a Memory Management Unit (MMU), and a Floating Point Unit (FPU). A CPU may include only a single CPU core (called a single-core CPU or single-core processor) or may include multiple CPU cores (called a chip multiprocessor (CMP) or multi-core processor).

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37. A CPU is designed to perform operations on data. Designers implement these operations in circuitry using a collection of techniques such as microarchitecture design, the placement of gates and routing of wires across the chip, selection of process technology nodes, and selection of the cell implementation libraries. This circuitry is represented in a type of computer language referred to as RTL code, which I will describe further in the next section.

B. RTL

38. RTL describes the implementation of the CPU's microarchitecture. RTL design is a digital design methodology that focuses on the transfer of data between registers within a digital system. It serves as an abstraction level between the high-level behavioral description of a system and its physical implementation in hardware. At the RTL level, designers describe the functionality and behavior of the system in terms of registers, data flow, and control signals.

39. A designer may develop an RTL description of a digital circuit manually using a Hardware Description Language (HDL) such as Verilog or automatically from a higher-level language using an RTL synthesis tool. After the RTL representation is completed, it is then transformed through a series of hardware compilers, place and route tools and cell libraries to create representation that helps with the fabrication of the actual physical device.

40. The RTL description may be organized into groups of code referred to as "modules," with each module likewise organized into smaller groups of code referred to as "submodules." Organizing the RTL into modules and submodules improves the efficiency in managing large projects by allowing code to be modularized and re-used in different aspects of the projects. For example, the RTL modules for complex functions implemented in a CPU can be treated as abstract boxes with input and output pins. Hence different module developers can easily interface without knowing the details of the module design.

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41. Verilog has some commonality with other high level programming languages like C or Fortran. For example, a module is, conceptually, very similar to a subroutine. However, the behavior of a Verilog program is generally dictated by the way signals are routed across connected modules rather than by the order of code that appears within the Verilog program.

42. For a simple example of RTL, consider a D (Delay) flip flop that transfers an input value to an output on the falling edge of a clock signal. This is a common component in digital logic circuits, like CPUs. The flip flop can be used to temporarily store data during CPU operation. The behavior of such a component could be described with RTL as follows:

```
Module Dff(q, clock, data);
output    q;
reg       q;
input     clock, data;

initial
q=0;

always
@(negedge clock) #1 q=data;
endmodule
```

43. The “always” statement in that RTL description indicates that when the clock goes from high to low (i.e., on a falling or negative edge) the output register “q” is assigned the input value “data” after a delay of one-time unit.

44. The use of RTL in the design of a CPU provides numerous advantages including ease of development of the processor using a high-level programming abstraction, much like writing software using C/C++ to accomplish an application task. The hardware designers do not need to worry too much about how the digital gates, such as AND and NOR gates, are implemented in a particular process technology node.

45. A second advantage provided by RTL is design validation in which the designers are able to simulate and test their design using commercial tools. Such testing allows the designers

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to identify and correct problems much earlier in the design process and with much less cost than would be incurred later during the fabrication process.

46. A third advantage provided by RTL is modularity. Designers can create libraries of RTL components that can be easily reused across an entire design. For example, the flip flop described in the example RTL code above may be a defined module that is re-used throughout CPU and SoC design. These reusable blocks can be easily integrated into new designs, promoting design reuse, reducing development time, and enabling faster prototyping and system assembly.

VI. BACKGROUND FACTS

47. In this section, I summarize my review of information relevant to my analysis, including a background of the early development work Nuvia did for the [REDACTED]

[REDACTED]

[REDACTED], and

ARM RTL made available through the [REDACTED]

A. Nuvia

48. Nuvia was founded in 2019 by Gerard Williams (CEO, who formerly worked at Apple), Manu Gulati (SVP Silicon Engineering, who formerly worked at Google), and John Bruno (SVP Engineering, who formerly worked at Google) with the goal of bringing higher energy efficiency and performance to the server market. QCARM_0002749 at 59-60; QCARM_2414840. Nuvia focused on the design and development of chips used in data centers, by specializing the chip by prioritizing efficiency for operations common in data centers and less common in desktops, laptops, and mobile devices. [REDACTED]

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[REDACTED]

[REDACTED]

49. Qualcomm acquired Nuvia on March 15, 2021.³

B. Qualcomm

50. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

51. I have been informed that during the early development of [REDACTED] at Nuvia, Nuvia entered into license agreements with ARM that enabled Nuvia to access certain ARM IP, including some RTL modules (ARM RTL). Nuvia instantiated some ARM RTL in the [REDACTED] by downloading the ARM RTL through ARM Connect (using Nuvia's credentials), which is a website made available to ARM licensees such as Nuvia. I provide additional information regarding ARM Connect below.

52. I have been informed that ARM terminated the license agreement with Nuvia on or around March 2022, about one year after Qualcomm completed its acquisition of Nuvia. [REDACTED]

[REDACTED]

³ <https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia>

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[REDACTED]

[REDACTED]

53. I have been informed that Qualcomm had separate license agreements with ARM, which were in effect at the time that Qualcomm completed the acquisition of Nuvia and continues to remain in effect at the time that I provide this Report. Through those licenses, Qualcomm has a license for and corresponding access to at least the same ARM RTL as downloaded under the Nuvia license. A licensee like Qualcomm can obtain the ARM RTL through ARM Connect by using its credentials supplied by ARM as part of a license with ARM. I will refer throughout my report to the ARM RTL that is available on ARM Connect as “Nuvia-sourced ARM RTL” for copies of ARM RTL that Nuvia downloaded from ARM Connect using Nuvia’s credentials, and “Qualcomm-sourced ARM RTL” for copies of ARM RTL that Qualcomm downloaded from ARM Connect using Qualcomm’s credentials.

54. As I will describe in more detail below, Qualcomm undertook reasonable efforts to identify Nuvia-sourced ARM RTL and completely remove it from its source code repositories. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

C. ARM Connect

55. [REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

56. ARM allows its customers to download ARM IP such as RTL, documentation, or release notes through its Product Download Hub, formerly known as Connect.⁴ I will focus on Connect as it was the platform available during the relevant time period discussed in this report, namely 2019 through 2022.⁵

57. As described in the Connect user guide: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁴ <https://developer.arm.com/documentation/107572/latest/>.

⁵ According to ARM documentation, Connect was closed around August 2022, and transitioned to the Product Download Hub that appears to contain similar functionality.
<https://developer.arm.com/documentation/107571/latest/>.

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Connect Product Page for Cortex-M3

Id. at 74.

58. Within the Connect platform, the download process includes three stages [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

VII. ANALYSIS

59. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

A. The Qualcomm Codebases

60. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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61.

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62.

[REDACTED]

[REDACTED]

[REDACTED]

63.

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64. [REDACTED]

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65. [REDACTED]

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66. [REDACTED]

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67. [REDACTED]

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68. [REDACTED]

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[REDACTED]

[REDACTED]

69. [REDACTED]

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[REDACTED]

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70. [REDACTED]

[REDACTED]

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[REDACTED]

71. [REDACTED]

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72.

[REDACTED]

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73.

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[REDACTED]

1.

[REDACTED]

74.

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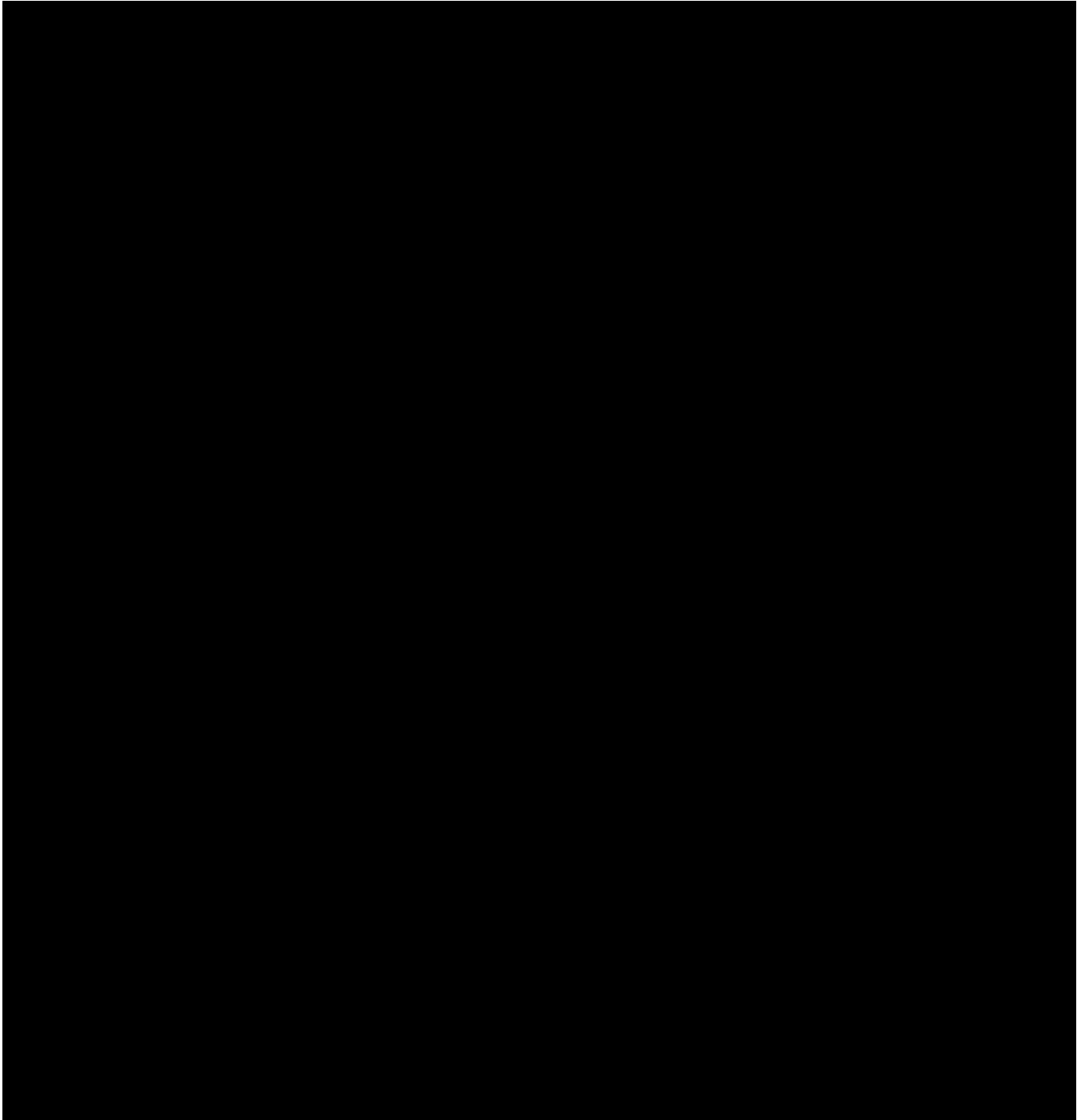
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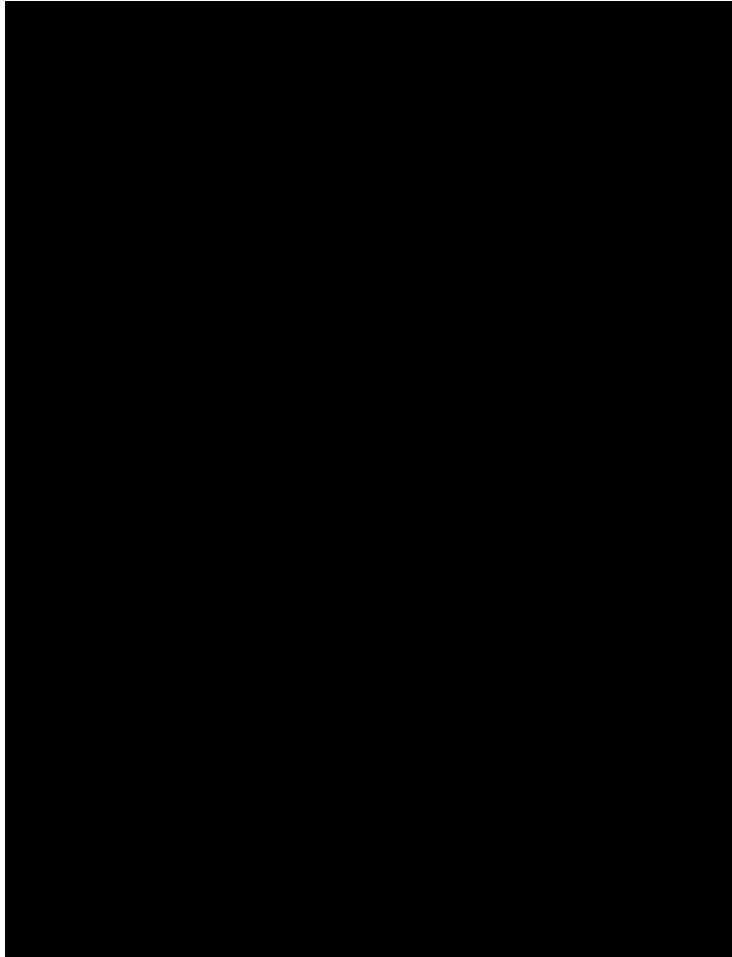
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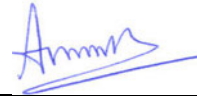
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I certify under penalty of perjury that the foregoing is true and correct.

Date: December 20, 2023



Murali Annavaram, Ph.D.

Los Angeles, California

EXHIBIT 11



Qualcomm Technologies, Inc.

5775 Morehouse Drive, San Diego, CA 92121

www.qualcomm.com

January 27, 2021

Paul Williamson, VP, General Manager Client Line of Business
ARM Limited

VIA EMAIL

Dear Paul:

As you may have seen in the press, Qualcomm Incorporated recently announced that its subsidiary, Qualcomm Technologies, Inc. ("QTI"), has entered into a definitive agreement to acquire NUVIA Inc. ("NUVIA"). [REDACTED]

Following the closing of the acquisition, for ease of operation and structure, QTI intends to transfer NUVIA's work and employees to QTI and other current Qualcomm subsidiaries and have the then former NUVIA employees [REDACTED]

I apologize for the short fuse on this request, but given the pace of the acquisition, please let us know by February 3, 2021 if the foregoing poses any concerns for ARM. We look forward to continuing (and with this acquisition, expanding) our mutually beneficial partnership into the future.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ziad Asghar".

Ziad Asghar
VP, Product Management
Qualcomm Technologies, Inc.

EXHIBIT 12



Gerard Williams III
CEO and President
NuVia, Inc.
2841 Mission College Blvd., 4th Floor
Santa Clara, CA 94024

1 February 2022

Dear Gerard:

We write pursuant to the Architecture License Agreement (ALA #CM0001215) and the Technology License Agreement (TLA #CM0001229), both dated September 27, 2019, between our companies (collectively, "the Agreements").

Arm intends to terminate both agreements for material breach under [REDACTED] of the Agreements. NuVia violated the assignment provisions, [REDACTED], of the Agreements, by entering into the acquisition of NuVia by Qualcomm without Arm's consent. NuVia also violated the confidentiality provisions under [REDACTED] of the Agreements and made unlicensed use of Arm's confidential information in violation of [REDACTED] of the Agreements.

Following termination, under [REDACTED] of the Agreements, NuVia must:

[REDACTED]

These obligations extend to Qualcomm and its widely publicized use of NuVia's technology developed under NuVia's ALA and TLA. The certification set forth immediately above should thus extend to Qualcomm as well.

This termination will be effective as of March 1, 2022.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carolyn Herzog', written over a horizontal line.

Carolyn Herzog
Executive Vice President and General Counsel
Arm Limited

cc: Ann Chaplin, General Counsel & Corporate Secretary
Qualcomm Technologies, Inc.
5775 Morehouse Drive
San Diego, CA 92121

EXHIBIT 13

HIGHLY CONFIDENTIAL ATTORNEYS' EYES ONLY

Page 1

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

---oOo---

ARM LTD., a UK Corporation,)
)
Plaintiff,)
)
vs.) C.A. No. 22-1146 (MN)
)
QUALCOMM INC., a Delaware)
corporation; QUALCOMM)
TECHNOLOGIES, INC., a)
Delaware Corporation, and)
NUVIA, INC., a Delaware)
Corporation,)
)
Defendants.)
_____)

HIGHLY CONFIDENTIAL ATTORNEYS' EYES ONLY
VIDEOTAPED DEPOSITION OF RENE HAAS
TUESDAY, DECEMBER 12, 2023

STENOGRAPHICALLY REPORTED BY:
ANDREA M. IGNACIO, CSR, RPR, CRR, CCRR, CLR ~
CSR LICENSE NO. 9830
JOB NO. 6326906

HIGHLY CONFIDENTIAL ATTORNEYS' EYES ONLY

Page 2	Page 4
<p>1 UNITED STATES DISTRICT COURT 2 FOR THE DISTRICT OF DELAWARE 3 ---oOo--- 4 5 ARM LTD., a UK Corporation,) 6) 7 Plaintiff,) 8) 9 vs.) C.A. No. 22-1146 (MN) 10) 11 QUALCOMM INC., a Delaware) 12 corporation; QUALCOMM) 13 TECHNOLOGIES, INC., a) 14 Delaware Corporation, and) 15 NUVIA, INC., a Delaware) 16 Corporation,) 17 Defendants.) 18 _____) 19 20 Videotaped deposition of RENE HAAS, taken on 21 behalf of the Defendant, pursuant to Notice, on 22 Tuesday, December 12, 2023, at Morrison & Foerster, 23 LLP, 755 Page Mill Road, Palo Alto, California 24 beginning at 9:25 a.m., and ending at 6:02 p.m., 25 before me, ANDREA M. IGNACIO, CSR, RPR, CCRR, CRR, CLR ~ License No. 9830.</p>	<p>1 I N D E X 2 3 WITNESS: Rene Haas 4 5 EXAMINATION PAGE 6 BY MS. DUNN 9, 351 7 BY MS. YING 319 8 BY MR. JACOBS 348, 354 9 10 E X H I B I T S 11 EXHIBIT PAGE 12 Exhibit 142 RH Masa 2.4 20.22.ptx Bates 14 13 ARM_01230402 - '81 14 Exhibit 143 2022-04-28 Rene briefing Bates 47 15 ARM_00098756 16 Exhibit 144 Chat Filters, Bates 59 17 ARM_01241616 - 20 18 Exhibit 145 Chat Filters, Bates 73 19 ARM_00082083 - '89 20 Exhibit 146 Chat Filters, Bates 108 21 ARM_00082120 - '27 22 Exhibit 147 Chat Filters, Bates 124 23 ARM_01239056 - '68 24 Exhibit 148 2-1-22 Letter, Bates ARM_00037427 136 25 //</p>
Page 3	Page 5
<p>1 A P P E A R A N C E S: 2 3 FOR THE PLAINTIFF: 4 MORRISON & FOERSTER LLP 5 By: MICHAEL JACOBS, Esq. 6 ERIK J. OLSON, Esq. 7 755 Page Mill Road 8 Palo Alto, California 94304 9 650.813.5825 10 mjacobs@mofo.com 11 12 FOR THE DEFENDANT: 13 PAUL WEISS 14 By: KAREN L. DUNN, Esq. 15 MADALYN VAUGHN, Esq. New York 16 ERIN MORGAN, Esq. New York 17 2001 K Street, NW 18 Washington, D.C. 20006-1047 19 kdunn@paulweiss.com 20 21 22 ALSO PRESENT: 23 Doug Stock, Videographer 24 Robert Calico, Arm Ltd. 25 ---oOo---</p>	<p>1 EXHIBITS 2 EXHIBIT PAGE 3 Exhibit 149 Chat Filters, Bates 153 4 ARM_00087926 - '29 5 Exhibit 150 Chat Filters, Bates 175 6 ARM_00087844 - '50 7 Exhibit 151 8-31-22 E-mail Bates 184 8 ARM_00094320 - '63 9 Exhibit 152 8-31-22 E-mail Bates 200 10 ARM_00110511 - '12 11 Exhibit 153 Chat Filters, Bates 225 12 ARM_00087844 - '50 13 Exhibit 154 3-5-23 E-mail Bates 231 14 ARM_01215878 - '79 15 Exhibit 155 Anticipated Acquisition by Nvidia 273 16 Corporation of Arm Limited Initial 17 Submission 12-20-21 Bates 18 ARM_00088656 - '84 19 Exhibit 156 Chat Filters, Bates ARM_01239046 288 20 - '49 21 Exhibit 157 [REDACTED] 310 22 10-4-22, Bates ARM_01427450 - '92 23 Exhibit 158 How a Lopsided Apple Deal Got 326 24 Under Arm's Skin 25 //</p>

2 (Pages 2 - 5)

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<p style="text-align: right;">Page 6</p> <p>1 PREVIOUSLY MARKED EXHIBITS</p> <p>2 EXHIBIT PAGE</p> <p>3 Exhibit 108 2-16-21 Letter, Bates 91</p> <p>4 ARM_01284106</p> <p>5</p> <p>6 ---oOo---</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 8</p> <p>1 financially interested in the outcome.</p> <p>2 If there are any objections to proceeding,</p> <p>3 please state them at the time of your appearance.</p> <p>4 Counsel and all present -- and all present</p> <p>5 will now state their appearance and affiliation for</p> <p>6 the record, beginning with the noticing attorney.</p> <p>7 MS. DUNN: Karen Dunn from Paul Weiss, on</p> <p>8 behalf of Qualcomm.</p> <p>9 MS. MORGAN: Erin Morgan from Paul Weiss, on</p> <p>10 behalf of Qualcomm.</p> <p>11 MS. VAUGHN: Madalyn Vaughn from Paul Weiss,</p> <p>12 on behalf of Qualcomm.</p> <p>13 MS. YING: Jennifer Ying from Morris Nichols</p> <p>14 Arsht & Tunnell, on behalf of Qualcomm.</p> <p>15 MR. JACOBS: Michael Jacobs, Morrison &</p> <p>16 Foerster, for Arm.</p> <p>17 MR. OLSON: Erik Olson, Morrison & Foerster,</p> <p>18 for Arm.</p> <p>19 MR. CALICO: I'm Rob Calico, in-house counsel</p> <p>20 for Arm.</p> <p>21 THE VIDEOGRAPHER: Thank you.</p> <p>22 And Madam Court Reporter, if you would please</p> <p>23 swear in the witness.</p> <p>24 And then, counsel, you may proceed.</p> <p>25</p>
<p style="text-align: right;">Page 7</p> <p>1 DEPOSITION PROCEEDINGS</p> <p>2 DECEMBER 12, 2023 9:25 A.M.</p> <p>3 ---oOo---</p> <p>4</p> <p>5 THE VIDEOGRAPHER: Good morning. We are on</p> <p>6 the record at 9:25 a.m. on December 12, 2023. 0</p> <p>7 Please note that the microphones are</p> <p>8 sensitive and may pick up whispering and private</p> <p>9 conversations. Please mute your phones at this time.</p> <p>10 Audio and video recording will continue to take place</p> <p>11 unless all parties agree to go off the record.</p> <p>12 This is Media Unit 1 of the video-recorded</p> <p>13 deposition of Rene Haas. Taken by counsel for the</p> <p>14 Defendant, in the matter of Arm Limited versus</p> <p>15 Qualcomm Inc., et al. This case is filed in the</p> <p>16 United States District Court for the District of</p> <p>17 Delaware. Case No. 22-1146(MN).</p> <p>18 The location of today's deposition is</p> <p>19 755 Page Mill Road, Palo Alto, California.</p> <p>20 My name is Douglas Stock, representing</p> <p>21 Veritext. I am the videographer.</p> <p>22 And the court reporter today is Andrea</p> <p>23 Ignacio, also from Veritext.</p> <p>24 I am not authorized to administer an oath. I</p> <p>25 am not related to any party in this action, nor am I</p>	<p style="text-align: right;">Page 9</p> <p>1 RENE HAAS,</p> <p>2 having been sworn as a witness</p> <p>3 by the Certified Shorthand Reporter,</p> <p>4 testified as follows:</p> <p>5</p> <p>6 MS. DUNN: Thank you.</p> <p>7</p> <p>8 EXAMINATION</p> <p>9 BY MS. DUNN:</p> <p>10 Q Mr. Haas, when did you start working at Arm?</p> <p>11 A October of 2013.</p> <p>12 Q Great.</p> <p>13 And what was your role when you started at</p> <p>14 Arm?</p> <p>15 A I was vice president for strategic alliances.</p> <p>16 Q Okay. Are you trained as an engineer?</p> <p>17 A My degree is in engineering.</p> <p>18 Q Okay. Do you consider yourself an engineer</p> <p>19 today?</p> <p>20 A I don't do engineering work today.</p> <p>21 Q Okay. When was the last time you did any?</p> <p>22 A I was a field application engineer at NEC</p> <p>23 Electronics in the early 1990s. That was probably the</p> <p>24 last time.</p> <p>25 Q Okay. And then at some point, you were named</p>

3 (Pages 6 - 9)

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<p style="text-align: right;">Page 162</p> <p>1 with what was called [REDACTED]</p> <p>2 Do you recall that?</p> <p>3 A Yes.</p> <p>4 Q Okay. [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 A I don't know if we ever did.</p> <p>7 Q Okay.</p> <p>8 A I don't think we did.</p> <p>9 Q Okay. Okay.</p> <p>10 And then if you could just look at the end</p> <p>11 where Mr. Williamson is saying:</p> <p>12 [REDACTED]</p> <p>13 [REDACTED]</p> <p>14 [REDACTED]</p> <p>15 [REDACTED]</p> <p>16 [REDACTED]</p> <p>17 [REDACTED]</p> <p>18 [REDACTED]</p> <p>19 Do you see that?</p> <p>20 A Yes.</p> <p>21 Q Do you know what you're -- what you are</p> <p>22 talking about when you say [REDACTED]</p> <p>23 A [REDACTED]</p> <p>24 [REDACTED]</p>	<p style="text-align: right;">Page 164</p> <p>1 [REDACTED]</p> <p>2 [REDACTED]</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 [REDACTED]</p> <p>7 [REDACTED]</p> <p>8 [REDACTED]</p> <p>9 [REDACTED]</p> <p>10 [REDACTED]</p> <p>11 [REDACTED]</p> <p>12 [REDACTED]</p> <p>13 [REDACTED]</p> <p>14 MS. DUNN: Okay.</p> <p>15 [REDACTED]</p> <p>16 [REDACTED]</p> <p>17 [REDACTED]</p> <p>18 [REDACTED]</p> <p>19 [REDACTED]</p> <p>20 [REDACTED]</p> <p>21 [REDACTED]</p> <p>22 [REDACTED]</p> <p>23 [REDACTED]</p> <p>24 [REDACTED]</p>
<p style="text-align: right;">Page 163</p> <p>1 [REDACTED]</p> <p>2 [REDACTED]</p> <p>3 Q Okay. [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 [REDACTED]</p> <p>7 [REDACTED]</p> <p>8 [REDACTED]</p> <p>9 So Arm sued Qualcomm on August 31 of 2022.</p> <p>10 And at that time -- you recall that?</p> <p>11 You can put that to the side.</p> <p>12 You recall that Arm sued Qualcomm on</p> <p>13 August 31, 2022; correct?</p> <p>14 A Uh-huh.</p> <p>15 [REDACTED]</p> <p>16 [REDACTED]</p> <p>17 MR. JACOBS: Objection; form.</p> <p>18 [REDACTED]</p> <p>19 [REDACTED]</p> <p>20 [REDACTED]</p> <p>21 MS. DUNN: Yeah.</p> <p>22 [REDACTED]</p> <p>23 [REDACTED]</p> <p>24 [REDACTED]</p>	<p style="text-align: right;">Page 165</p> <p>1 [REDACTED]</p> <p>2 [REDACTED]</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 [REDACTED]</p> <p>7 [REDACTED]</p> <p>8 [REDACTED]</p> <p>9 [REDACTED]</p> <p>10 [REDACTED]</p> <p>11 [REDACTED]</p> <p>12 [REDACTED]</p> <p>13 [REDACTED]</p> <p>14 [REDACTED]</p> <p>15 [REDACTED]</p> <p>16 [REDACTED]</p> <p>17 [REDACTED]</p> <p>18 [REDACTED]</p> <p>19 [REDACTED]</p> <p>20 [REDACTED]</p> <p>21 [REDACTED]</p> <p>22 [REDACTED]</p> <p>23 [REDACTED]</p> <p>24 [REDACTED]</p>

42 (Pages 162 - 165)

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<p style="text-align: right;">Page 166</p> <p>6 Q Okay. [REDACTED]</p> <p>9 Q Okay. [REDACTED]</p> <p>14 Q Okay. [REDACTED]</p> <p>18 Q Okay. [REDACTED]</p> <p>21 Q Okay. [REDACTED]</p> <p>[REDACTED] Have -- actually, strike that,</p>	<p style="text-align: right;">Page 168</p> <p>18 MS. DUNN: Move to strike. And also, a good 19 amount of your answer was hearsay. 20 [REDACTED]</p>
<p style="text-align: right;">Page 167</p> <p>1 because there was -- ambiguous.</p> <p>5 Q Okay. [REDACTED]</p>	<p style="text-align: right;">Page 169</p>

HIGHLY CONFIDENTIAL ATTORNEYS' EYES ONLY

<p style="text-align: right;">Page 358</p> <p>1 Arm Ltd. v. Qualcomm Inc., Et Al.</p> <p>2 Rene Haas (#6326906)</p> <p>3 ERRATA SHEET</p> <p>4 PAGE____ LINE____ CHANGE_____</p> <p>5 _____</p> <p>6 REASON_____</p> <p>7 PAGE____ LINE____ CHANGE_____</p> <p>8 _____</p> <p>9 REASON_____</p> <p>10 PAGE____ LINE____ CHANGE_____</p> <p>11 _____</p> <p>12 REASON_____</p> <p>13 PAGE____ LINE____ CHANGE_____</p> <p>14 _____</p> <p>15 REASON_____</p> <p>16 PAGE____ LINE____ CHANGE_____</p> <p>17 _____</p> <p>18 REASON_____</p> <p>19 PAGE____ LINE____ CHANGE_____</p> <p>20 _____</p> <p>21 REASON_____</p> <p>22 _____</p> <p>23 _____</p> <p>24 Rene Haas Date</p> <p>25</p>	
<p style="text-align: right;">Page 359</p> <p>1 Arm Ltd. v. Qualcomm Inc., Et Al.</p> <p>2 Rene Haas (#6326906)</p> <p>3 ACKNOWLEDGEMENT OF DEPONENT</p> <p>4 I, Rene Haas, do hereby declare that I</p> <p>5 have read the foregoing transcript, I have made any</p> <p>6 corrections, additions, or changes I deemed necessary as</p> <p>7 noted above to be appended hereto, and that the same is</p> <p>8 a true, correct and complete transcript of the testimony</p> <p>9 given by me.</p> <p>10 _____</p> <p>11 _____</p> <p>12 Rene Haas Date</p> <p>13 *If notary is required</p> <p>14 SUBSCRIBED AND SWORN TO BEFORE ME THIS</p> <p>15 _____ DAY OF _____, 20____.</p> <p>16 _____</p> <p>17 _____</p> <p>18 _____</p> <p>19 NOTARY PUBLIC</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

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Inquiries about Veritext Legal Solutions' confidentiality and security policies and practices should be directed to Veritext's Client Services Associates indicated on the cover of this document or at www.veritext.com.

EXHIBIT 14

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Page 1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD.,)
)
Plaintiff and)
Counterclaim Defendant,)
)
v.) C.A. No. 22-1146
) (MN)
QUALCOMM INC., QUALCOMM)
TECHNOLOGIES, INC. and NUVIA,)
INC.,)
)
Defendants and)
Counterclaim Plaintiffs.)
_____)

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY
VIDEO-RECORDED DEPOSITION OF WILL ABBEY

Friday, October 27, 2023
Palo Alto, California

Stenographically Reported By:
Hanna Kim, CLR, CSR No. 13083
Job No. 6165933

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

<p style="text-align: right;">Page 2</p> <p>1 IN THE UNITED STATES DISTRICT COURT 2 FOR THE DISTRICT OF DELAWARE 3 4 ARM LTD.,) 5) 6 Plaintiff and) 7 Counterclaim Defendant,) 8) 9 v.) C.A. No. 22-1146 10) (MN) 11 QUALCOMM INC., QUALCOMM) 12 TECHNOLOGIES, INC. and NUVIA,) 13 INC.,) 14) 15 Defendants and) 16 Counterclaim Plaintiffs.) 17 _____) 18 19 20 21 22 23 24 25</p> <p>HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY, video-recorded deposition OF WILL ABBEY taken on behalf of the Defendants, at 755 Page Mill Road, Palo Alto, California 94304, on Friday, October 27, 2023, beginning at 9:06 a.m., PDT, and concluding at 5:42 p.m., before Hanna Kim, CLR, Certified Shorthand Reporter, No. 13083.</p>	<p style="text-align: right;">Page 4</p> <p>1 APPEARANCES OF COUNSEL: (CONTINUED) 2 3 ALSO PRESENT: 4 PHILLIP PRICE, Counsel for Arm Ltd. 5 SHAWNA HYNES, Video Operator 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>
<p style="text-align: right;">Page 3</p> <p>1 APPEARANCES OF COUNSEL: 2 3 FOR PLAINTIFF ARM LTD.: 4 MORRISON & FOERSTER LLP 5 BY: SCOTT F. LEWELLYN, ESQ. 6 4200 Republic Plaza 7 370 Seventeenth Street 8 Denver, Colorado 80202-5638 9 303.592.2204 10 sllewellyn@mofo.com 11 12 13 FOR DEFENDANTS QUALCOMM INC., QUALCOMM 14 TECHNOLOGIES, INC. AND NUVIA, INC.: 15 PAUL, WEISS, RIFKIND, WHARTON & GARRISON 16 LLP 17 BY: ERIN J. MORGAN, ESQ. 18 BY: MADALYN VAUGHN, ESQ. 19 2001 K Street, N.W. 20 Washington, D.C. 20006-1047 21 202.223.7300 22 emorgan@paulweiss.com 23 mvvaughn@paulweiss.com 24 25</p>	<p style="text-align: right;">Page 5</p> <p>1 INDEX OF EXAMINATION 2 3 WITNESS: WILL ABBEY 4 EXAMINATION PAGE 5 BY MS. MORGAN: 11 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>

2 (Pages 2 - 5)

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Page 6	Page 8
<p>1 INDEX OF EXHIBITS</p> <p>2</p> <p>3 ABBEY DEPOSITION EXHIBITS PAGE</p> <p>4 Exhibit QX19 E-mail from Tim Herbert, 79</p> <p>5 18/01/2022, and attachment;</p> <p>6 Bates nos. ARM_00088655</p> <p>7 through ARM_00088684</p> <p>8 Exhibit QX20 E-mail set, with top e-mail 136</p> <p>9 from Rene Haas, 28/01/2021;</p> <p>10 Bates nos. ARM_00081998</p> <p>11 Exhibit QX21 E-mail set, with top e-mail 146</p> <p>12 from Tim Herbert, 28/06/2021;</p> <p>13 Bates nos. ARM_00064035</p> <p>14 through ARM_00064036</p> <p>15 Exhibit QX22 E-mail from Will Abbey, 184</p> <p>16 02/06/2021, and attachment;</p> <p>17 Bates nos. ARM_00000019</p> <p>18 through ARM_00000021</p> <p>19 Exhibit QX23 E-mail set, with top e-mail 218</p> <p>20 from Will Abbey, 01/06/2021;</p> <p>21 Bates nos. ARM_00110012</p> <p>22 through ARM_00110016</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 INDEX OF EXHIBITS (CONTINUED)</p> <p>2</p> <p>3 ABBEY DEPOSITION EXHIBITS PAGE</p> <p>4 Exhibit QX29 E-mail set, with top e-mail 337</p> <p>5 from Lynn Couillard,</p> <p>6 02/09/2022; Bates nos.</p> <p>7 ARM_00094941 through ARM</p> <p>8 00094943</p> <p>9 Exhibit QX30 E-mail Will Abbey, 349</p> <p>10 02/05/2023, [REDACTED]</p> <p>11 [REDACTED]</p> <p>12 Bates nos. ARM_01215886</p> <p>13 --o0o--</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
Page 7	Page 9
<p>1 INDEX OF EXHIBITS (CONTINUED)</p> <p>2</p> <p>3 ABBEY DEPOSITION EXHIBITS PAGE</p> <p>4 Exhibit QX24 E-mail set, redacted, with top 251</p> <p>5 e-mail from RK Chunduru,</p> <p>6 8/24/2021; Bates nos.</p> <p>7 QCARM_3972038 through</p> <p>8 QCARM_3972039</p> <p>9 Exhibit QX25 E-mail from Will Abbey, 264</p> <p>10 31/08/2021, and attachment;</p> <p>11 Bates nos. ARM_00000016</p> <p>12 through ARM_00000018</p> <p>13 Exhibit QX26 E-mail from Will Abbey, 280</p> <p>14 30/09/2021, and attachment;</p> <p>15 Bates nos. ARM_00081785</p> <p>16 through ARM_00081787</p> <p>17 Exhibit QX27 E-mail set, with top e-mail 291</p> <p>18 from Will Abbey, 14/07/2021;</p> <p>19 Bates nos. ARM_00036331</p> <p>20 through ARM_00036334</p> <p>21 Exhibit QX28 E-mail from Will Abbey, 315</p> <p>22 31/08/2022, "Arm News"; Bates</p> <p>23 nos. ARM_01215564</p> <p>24</p> <p>25</p>	<p>1 Palo Alto, California</p> <p>2 Friday, October 27, 2023; 9:06 a.m., PDT</p> <p>3 --o0o--</p> <p>4 THE VIDEOGRAPHER: Good morning. We are</p> <p>5 going on the record at 9:06 a.m., on October 27,</p> <p>6 2023.</p> <p>7 Please note that the microphones are</p> <p>8 sensitive and may pick up whispering and private</p> <p>9 conversations.</p> <p>10 Please mute your phones at this time.</p> <p>11 Audio and video recording will continue to</p> <p>12 take place unless all parties agree to go off the</p> <p>13 record.</p> <p>14 This is Media Unit 1 of the video-recorded</p> <p>15 deposition of Will Abbey, taken by counsel for</p> <p>16 Defendant, in the matter of Arm, Ltd., versus</p> <p>17 Qualcomm Inc., et al., filed in the United States</p> <p>18 District Court, for the District of Delaware, Case</p> <p>19 Number 22-1146 MN.</p> <p>20 The location of the deposition is 755 Page</p> <p>21 Mill Road, Palo Alto, California 94304.</p> <p>22 My name is Shawna Hynes, representing</p> <p>23 Veritext Legal Solutions, and I am the videographer.</p> <p>24 The court reporter is Hanna Kim, from the</p> <p>25 firm Veritext Legal Solutions.</p>

3 (Pages 6 - 9)

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<p style="text-align: right;">Page 10</p> <p>1 I am not related to any party in this 2 action, nor am I financially interested in the 3 outcome. 4 If there are any objections to proceeding, 5 please state them at the time of your appearance. 6 Counsel and all present will now state 7 their appearances and affiliations for the record, 8 beginning with the noticing attorney. 9 MS. MORGAN: Good morning. I'm Erin 10 Morgan from Paul Weiss. I'm here with my colleague 11 Madalyn Vaughn. And we represent the Defendants in 12 this case. 13 MR. LLEWELLYN: Scott Llewellyn, Morrison 14 & Foerster, for Arm. 15 With me is Phillip Price, in-house counsel 16 for Arm. 17 THE VIDEOGRAPHER: Thank you. 18 Will the court reporter please swear in 19 the witness. 20 /// 21 /// 22 /// 23 /// 24 /// 25 ///</p>	<p style="text-align: right;">Page 12</p> <p>1 Q. Is there any reason you can't do that 2 today? 3 A. No reason at all. 4 Q. Okay. A funny thing about a deposition is 5 that everything that you say is being written down 6 by the court reporter. 7 What that means is that even though you're 8 on video and even though in a normal conversation if 9 I ask you a question you could nod or say "mm-hmm" 10 or something like that and it would indicate a 11 response, for the court reporter, you have to give 12 an actual verbal response. 13 So you should try to remember to do that. 14 I have the same issue. I nod when I'm responding. 15 I'll try to remind you. She'll remind both of us. 16 But can you try to give a verbal response 17 when I ask you a question? 18 A. I will. 19 Q. Okay. 20 Also for the court reporter, we have to 21 try not to talk over each other. It's weird. It's 22 not like a normal conversation where you can finish 23 someone's sentence, but we have to make an effort 24 for me to ask the question and then for you to 25 answer. I will try not to cut you off.</p>
<p style="text-align: right;">Page 11</p> <p>1 WILL ABBEY, 2 having been duly administered an oath over 3 videoconference as stipulated by all counsel, was 4 examined and testified as follows: 5 6 EXAMINATION 7 BY MS. MORGAN: 8 Q. Good morning. 9 A. Good morning. 10 Q. Can you state your name for the record? 11 A. Will Abbey. 12 Q. Okay. Mr. Abbey, have you ever been 13 deposed before? 14 A. No. This is the first time. 15 Q. Okay. So I'm sure your counsel has gone 16 over some of this with you, but I'm just going to 17 explain a couple of ground rules to you and -- and 18 make sure that you understand what we're doing 19 today. 20 Okay? 21 A. Yes, that's okay. 22 Q. Okay. So you understand that you're under 23 oath at this deposition and that you're expected to 24 tell the truth in response to my questions; right? 25 A. I do.</p>	<p style="text-align: right;">Page 13</p> <p>1 Can you try to do the same? 2 A. Absolutely. 3 Q. Again, as your colleagues know or as your 4 counsel knows, I will fail at this. So, you know, 5 it's not -- it's not the end of the world, but we 6 should just make an effort, and Hanna will keep us 7 in line. 8 If you don't understand a question, you 9 should ask me to clarify. 10 Does that make sense? 11 A. It does. 12 Q. Okay. And from time to time your attorney 13 may object. It's fine for you to go ahead and 14 answer. The objection is for the record, unless he 15 tells you specifically not to answer a question, 16 which typically would come up in the context of 17 privileged information, which I'm not going to be 18 seeking today. 19 Do you understand? 20 A. I do. 21 Q. Okay. Do you have any questions before we 22 get started? 23 A. No questions at all. 24 Q. Okay. Oh, I should also say, I'm going to 25 try to take a break about every hour because</p>

4 (Pages 10 - 13)

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<p style="text-align: right;">Page 362</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>9 MR. LLEWELLYN: Objection. Form.</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>13 BY MS. MORGAN:</p> <p>14 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>17 MR. LLEWELLYN: Objection. Form.</p> <p>18 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p style="text-align: right;">Page 364</p> <p>1 [REDACTED]</p> <p>2 MR. LLEWELLYN: Objection. Form.</p> <p>3 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>6 BY MS. MORGAN:</p> <p>7 [REDACTED]</p> <p>[REDACTED]</p> <p>9 MR. LLEWELLYN: Objection. Form.</p> <p>10 Mischaracterizes testimony.</p> <p>11 BY MS. MORGAN:</p> <p>12 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>20 MR. LLEWELLYN: Objection. Calls for</p> <p>21 speculation.</p> <p>22 [REDACTED]</p> <p>[REDACTED]</p> <p>24 BY MS. MORGAN:</p> <p>25 [REDACTED]</p>
<p>[REDACTED]</p> <p>[REDACTED]</p> <p>3 BY MS. MORGAN:</p> <p>4 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>17 MR. LLEWELLYN: Objection. Form.</p> <p>18 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>22 BY MS. MORGAN:</p> <p>23 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>20 MR. LLEWELLYN: Objection. Form.</p> <p>21 [REDACTED]</p> <p>22 BY MS. MORGAN:</p> <p>23 [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>

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Page 366

1 [REDACTED]

2 MR. LLEWELLYN: Objection. Form.

3 [REDACTED]

4 BY MS. MORGAN:

5 [REDACTED]

6 [REDACTED]

7 [REDACTED]

8 [REDACTED]

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 [REDACTED]

19 [REDACTED]

20 [REDACTED]

21 [REDACTED]

22 [REDACTED]

23 MR. LLEWELLYN: Objection. Form.

24 [REDACTED]

25 [REDACTED]

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1 BY MS. MORGAN:

2 [REDACTED]

3 [REDACTED]

4 [REDACTED]

5 MR. LLEWELLYN: Objection. Form.

6 [REDACTED]

7 [REDACTED]

8 BY MS. MORGAN:

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 MR. LLEWELLYN: Objection. Form.

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 MS. MORGAN: Mr. Abbey, I have no further

19 questions for you.

20 [REDACTED]

21 [REDACTED]

22 MR. LLEWELLYN: No questions. We're done.

23 MS. MORGAN: So then we can congratulate

24 you on finishing your deposition and thank you for

25 your time. And we can go off the record.

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1 THE WITNESS: Thank you so much.

2 THE VIDEOGRAPHER: Do you want to get your

3 orders on the record?

4 MR. LLEWELLYN: No, I --

5 THE VIDEOGRAPHER: This marks the -- one

6 moment.

7 We are off the record at 5:42 p.m., and

8 this concludes today's testimony given by Will

9 Abbey. The total number of media used was seven and

10 will be retained by Veritext Legal Solutions.

11 (Proceedings concluded, 5:42 p.m., PDT, on

12 October 27, 2023.)

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Page 369

1 CERTIFICATE OF REPORTER

2 I, Hanna Kim, a Certified Shorthand

3 Reporter, do hereby certify:

4 That prior to being examined, the witness

5 in the foregoing proceedings was by me duly sworn to

6 testify to the truth, the whole truth, and nothing

7 but the truth;

8 That said proceedings were taken before me

9 at the time and place therein set forth and were

10 taken down by me in shorthand and thereafter

11 transcribed into typewriting under my direction and

12 supervision;

13 I further certify that I am neither

14 counsel for, nor related to, any party to said

15 proceedings, not in anywise interested in the

16 outcome thereof.

17 Further, that if the foregoing pertains to

18 the original transcri

19 case, before compl

20 of the transcript [x]

21 In witness wh

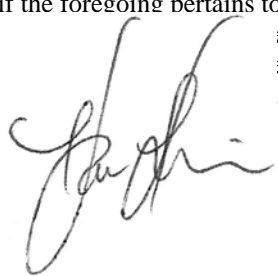
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Hanna Kim
CLR, CSR No. 13083

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

<div style="text-align: right;">Page 370</div> <p>1 SCOTT F. LLEWELLYN, ESQ. 2 sllewellyn@mofo.com 3 November 1, 2023 4 RE: ARM Ltd. v. Qualcomm Inc., Et Al. 5 10/27/2023, Will Abbey (#6165933) 6 The above-referenced transcript is available for 7 review. 8 Within the applicable timeframe, the witness should 9 read the testimony to verify its accuracy. If there are 10 any changes, the witness should note those with the 11 reason, on the attached Errata Sheet. 12 The witness should sign the Acknowledgment of 13 Deponent and Errata and return to the deposing attorney. 14 Copies should be sent to all counsel, and to Veritext at 15 cs-ny@veritext.com. 16 17 Return completed errata within 30 days from 18 receipt of testimony. 19 If the witness fails to do so within the time 20 allotted, the transcript may be used as if signed. 21 22 Yours, 23 Veritext Legal Solutions 24 25</p>	<div style="text-align: right;">Page 372</div> <p>1 JURAT 2 3 I, WILL ABBEY, do hereby certify under 4 penalty of perjury that I have read the foregoing 5 transcript of my deposition taken on Friday, 6 October 27, 2023; that I have made such corrections 7 as appear noted herein in ink, initialed by me; that 8 my testimony as contained herein, as corrected, is 9 true and correct. 10 11 Dated this ____ day of _____, 2023, 12 at _____. 13 14 15 16 17 18 _____ 19 WILL ABBEY 20 21 22 23 24 25</p>
<div style="text-align: right;">Page 371</div> <p>1 ERRATA SHEET FOR THE TRANSCRIPT OF: 2 Case Name: ARM, LTD. vs. QUALCOMM, ET AL. 3 Dep. Date: OCTOBER 27, 2023 4 Deponent: WILL ABBEY 5 CORRECTIONS: 6 Pg. Ln. Now Reads Should Read Reason 7 _____ 8 _____ 9 _____ 10 _____ 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ 16 _____ 17 _____ 18 _____ 19 _____ 20 Signature of Deponent 21 SUBSCRIBED AND SWORN BEFORE ME 22 THIS ____ DAY OF _____, 2023. 23 _____ 24 (Notary Public) MY COMMISSION 25 EXPIRES: _____</p>	

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted

fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

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EXHIBIT 15

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Page 1

H I G H L Y C O N F I D E N T I A L

ATTORNEYS' EYES ONLY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

C.A. NO: 22-1146 (MN)

ARM LTD., a UK Corporation,

Plaintiff,

v.

QUALCOMM INC., a Delaware corporation,

QUALCOMM TECHNOLOGIES, INC., a

Delaware Corporation, and NUVIA, INC., a

Delaware Corporation,

Defendants.

Deposition of PAUL WILLIAMSON, taken by AILSA
WILLIAMS, Certified Court Reporter, held at the
offices of Norton Rose Fulbright, London, United
Kingdom, on 9 November, 2023 at 9:00 a.m

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Page 2	Page 4
<p>1 A P P E A R A N C E S:</p> <p>2 Attorneys for the Plaintiff:</p> <p>3 MORRISON & FOERSTER LLP</p> <p>4 BY: KYLE W.K. MOONEY</p> <p>5 Kmooney@mofo.com</p> <p>6</p> <p>7 For the Defendants:</p> <p>8 PAUL, WEISS, RIFKIND, WHARTON & GARRISON</p> <p>9 LLP</p> <p>10 BY: MELISSA FELDER ZAPPALA and BRIAN SHIUE</p> <p>11 Mzappala@paulweiss.com</p> <p>12 Bshiue@paulweiss.com</p> <p>13</p> <p>14 ALSO PRESENT:</p> <p>15 PHILIP PRICE: (ARM)</p> <p>16 COURT REPORTER: AILSA WILLIAMS</p> <p>17 VIDEOGRAPHER: PHILIP HILL</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 QX59 Email and attachments, ARM_00048483-84 ...147</p> <p>2 QX60 Email and attachments, ARM_00032623-25 ...158</p> <p>3 QX61 Email and attachments, ARM_00032605-06 ...168</p> <p>4 QX62 Email and attachments, ARM_00032598-99 ...184</p> <p>5 QX63 Email exchange, ARM_00095801-02190</p> <p>6 QX64 Teams Chat, ARM_00098825-27193</p> <p>7 QX65 Email and attachments, ARM_01294035-36 ...198</p> <p>8 QX66 Teams Chat, ARM_00115764203</p> <p>9 QX67 Teams Chat and Slide Deck,221</p> <p>10 ARM_00082120-31</p> <p>11 QX68 Team Chat, ARM_00081197229</p> <p>12 QX69 Complaint240</p> <p>13 QX70 Email exchange, ARM_01238950-54253</p> <p>14 QX71 [REDACTED]262</p> <p>15 ARM_01240527-94</p> <p>16 QX72 Teams Chat, ARM_00087733-35272</p> <p>17 QX73 Email exchange, ARM_01231257-59295</p> <p>18 QX74 [REDACTED]</p> <p>[REDACTED] ARM_01291819-62</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
Page 3	Page 5
<p>1</p> <p>2 I N D E X</p> <p>3 PAUL WILLIAMSON (Sworn)</p> <p>4 Examination by MS. ZAPPALA: Pg. 6</p> <p>5 Examination by MR. MOONEY: Pg. 310</p> <p>6 Further Examination by MS. ZAPPALA: Pg. 314</p> <p>7</p> <p>8 INDEX OF EXHIBITS</p> <p>9 Previously Marked Exhibits Referenced:</p> <p>10 Exhibit QX 19, Exhibit QX29</p> <p>11 QX45 Notice of Deposition8</p> <p>12 QX46 Email exchange ARM_01238940-44 13</p> <p>13 QX47 Teams Chat ARM_00087671-73 14</p> <p>14 QX48 Teams Chat ARM_01241616-20 31</p> <p>15 QX49 Technology License Agreement 47</p> <p>16 QX50 Annex 1, ARM_00111082-97 48</p> <p>17 QX51 Teams Chat, ARM_00087851 56</p> <p>18 QX52 Teams Chat, ARM_01242365-66 66</p> <p>19 QX53 Email exchange, ARM_00063607-10 71</p> <p>20 QX54 "ARM - Qualcomm & Nuvia Architecture 78</p> <p>21 License"</p> <p>22 QX55 Annex 1, ARM_00002654-67 88</p> <p>23 QX56 Teams Chat, ARM_01239039-45 94</p> <p>24 QX57 Teams Chat, ARM_00082090-93119</p> <p>25 QX58 Email and attachments, ARM_00032601-02 ...144</p>	<p>1 THE VIDEOGRAPHER: Good morning. We are 09:26</p> <p>2 going on the record. The time is 09:24 a.m. local 09:26</p> <p>3 time in London, UK, on November 9, 2023. 09:26</p> <p>4 This is the beginning of media number 09:27</p> <p>5 one, volume one, in the video recorded deposition 09:27</p> <p>6 of Paul Williamson, taken by counsel for plaintiff 09:27</p> <p>7 in the matter of ARM Limited versus Qualcomm Inc 09:27</p> <p>8 et al, filed in the United States District Court 09:27</p> <p>9 for the District of Delaware, case number/docket 09:27</p> <p>10 number C.A No: 22-1146 (MN). 09:27</p> <p>11 This deposition is being held at Norton 09:27</p> <p>12 Rose Fulbright at the London office. 09:27</p> <p>13 My name is Philip Hill from Veritext 09:27</p> <p>14 Legal Solutions and I am the videographer. The 09:27</p> <p>15 court reporter is Ailsa Williams, also from 09:27</p> <p>16 Veritext Legal Solutions. 09:27</p> <p>17 Please would counsel introduce 09:27</p> <p>18 themselves for the record. 09:27</p> <p>19 MS. ZAPPALA: Melissa Zappala, on behalf 09:28</p> <p>20 of defendant, of Paul Weiss. With me is my 09:28</p> <p>21 colleague, Brian Shiue. One correction for the 09:28</p> <p>22 record, this deposition is being taken by 09:28</p> <p>23 defendants and counter claimants. 09:28</p> <p>24 MR. MOONEY: Kyle Mooney, Morrison and 09:28</p> <p>25 Foerster, counsel for ARM and with me is Philip 09:28</p>

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Page 6			Page 8		
1	Price Senior Director and Head of Litigation at	09:28	1	Q Let me share with you the deposition	09:30
2	ARM.	09:28	2	notice. So this would be marked as Exhibit QX45.	09:30
3	THE VIDEOGRAPHER: Would the court	09:28	3	(Exhibit QX45 marked for identification)	09:31
4	reporter swear in the witness.	09:28	4	I have put in front of you as QX45 our	09:31
5	PAUL WILLIAMSON	09:28	5	notice 30(b)(6) deposition notice. I wanted to	09:31
6	Having been sworn,	09:28	6	make sure we are on the same page in terms of the	09:31
7	Testified as follows:	09:28	7	topics that you will be testifying about in your	09:31
8	EXAMINATION BY MS. ZAPPALA:	09:28	8	corporate representative capacity. I understand	09:31
9	MS. ZAPPALA: Good morning.	09:28	9	they are topics -- the topics start on page 4.	09:31
10	A Good morning.	09:28	10	I understand you to be testifying on topics 1, 20,	09:31
11	Q Could you state your name for the	09:28	11	21, 23, 25, 27, 28, 30, 31, 33, 34, 35, 36, 37,	09:31
12	record.	09:28	12	40, 41, and 59. Is that consistent with your	09:32
13	A My name is Paul Williamson.	09:28	13	understanding?	09:32
14	Q I am Melissa Zappala. I will be	09:28	14	MR. MOONEY: Counsel, let me jump in so	09:32
15	taking your deposition today. I just wanted to go	09:28	15	the witness doesn't become uncomfortable because	09:32
16	over a couple of ground rules for the deposition.	09:29	16	he doesn't remember all the numbers. Let me	09:32
17	One thing I wanted to note, I have a	09:29	17	represent that yes, Mr. Williamson is designated	09:32
18	hearing loss. It affects my speech. You are	09:29	18	to testify as to topics 1, 20, 21, 23, 25, 27, 28,	09:32
19	British, you have an accent, so we may have a	09:29	19	30, 31, 33, 34, 35, 36, 37, 40, 41 and 59,	09:32
20	sense of dueling accents here. If you can't	09:29	20	consistent with ARM's objections and the	09:32
21	understand anything I say, please ask me to repeat	09:29	21	agreements reached between the parties, as well as	09:32
22	myself. Likewise, if I have difficulty I hope you	09:29	22	any objections that are made today, but subject to	09:33
23	will indulge me by repeating the answer.	09:29	23	that the list of numbers I think does match what	09:33
24	A Absolutely, and I appreciate you	09:29	24	you read out.	09:33
25	sharing that with me.	09:29	25	MS. ZAPPALA: Thank you. If I had just	09:33
Page 7			Page 9		
1	Q So we have a clean record I will be	09:29	1	asked your counsel that would have been easiest.	09:33
2	asking questions, I would appreciate if you would	09:29	2	Okay. So we are agreed between counsel	09:33
3	wait for me to finish my question and likewise	09:29	3	we are going to combine your individual testimony	09:33
4	I will wait for you to finish your answer, so that	09:29	4	with the corporate representative testimony. For	09:33
5	the court reporter can take down what we are both	09:29	5	the sake of efficiency on the record, if we get to	09:33
6	saying. Is that okay?	09:29	6	a set of questions on which you have been	09:33
7	A I understand, yes.	09:29	7	designated that you don't have personal knowledge	09:33
8	Q And if at any time you need a	09:29	8	of, please let me know so then we can make a	09:33
9	break, please ask and we can accommodate that.	09:29	9	record that you don't have personal knowledge of	09:33
10	Also, in terms of the natural pattern of	09:29	10	the issue but are testifying as a corporate	09:33
11	human speech, people tend to say "uh-huh", nod	09:29	11	representative. Does that make sense?	09:33
12	their head. It is important for the deposition	09:30	12	MR. MOONEY: Objection.	09:33
13	transcript to give audible answers. I would	09:30	13	A Yes.	09:33
14	appreciate if you keep that in mind.	09:30	14	MR. MOONEY: I'm not even following	09:33
15	A Understood.	09:30	15	this.	09:33
16	Q Is there any reason you cannot give	09:30	16	MS. ZAPPALA: We are going to ask	09:33
17	truthful testimony today?	09:30	17	questions because a lot of the topics on which he	09:33
18	A None.	09:30	18	has been designated will lead into his personal	09:33
19	Q We are here today taking your	09:30	19	knowledge, so we are not going topic by topic, we	09:33
20	deposition in your personal capacity as an	09:30	20	are combining the record.	09:34
21	individual witness, but you understand that you	09:30	21	MR. MOONEY: That is fine but you are	09:34
22	have been designated as a corporate representative	09:30	22	asking him to tell you if he doesn't have personal	09:34
23	on behalf of ARM on a few topics. Do you have	09:30	23	knowledge or if he does for each question? I am	09:34
24	that understanding?	09:30	24	not following this.	09:34
25	A I do.	09:30	25	MS. ZAPPALA: No, I am saying if we get	09:34

3 (Pages 6 - 9)

[illegible][illegible]

<p>Page 246</p> <p>17:39</p> <p>2</p> <p>17:41</p> <p>17:41</p>	<p>Page 248</p> <p>1</p> <p>17:44</p> <p>24</p> <p>17:44</p>
<p>Page 247</p> <p>1</p> <p>17:43</p>	<p>Page 249</p> <p>1</p> <p>17:45</p> <p>9 MR. MOONEY: Form, vague. 17:45</p> <p>10 A</p> <p>17:46</p>

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Page 314	Page 316
<p>1 they sent those messages? 19:46</p> <p>2 A No. 19:46</p> <p>3 Q Are you aware of anybody else who 19:46</p> <p>4 sent the messages in these exhibits having spoken 19:46</p> <p>5 to any lawyer about the content of any of these 19:46</p> <p>6 messages before they were sent? 19:46</p> <p>7 A No. 19:46</p> <p>8 MR. MOONEY: No further questions. 19:46</p> <p>9 Further Examination by MS. ZAPPALA: 19:46</p> <p>10 MS. ZAPPALA: One redirect. So counsel 19:47</p> <p>11 asked you a number of questions about whether you 19:47</p> <p>12 reviewed the Nuvia ALA before you sent those 19:47</p> <p>13 messages, correct? 19:47</p> <p>14 A Yes. 19:47</p> <p>15 Q At the time that you sent those 19:47</p> <p>16 messages, were the real comments in those messages 19:47</p> <p>17 your best understanding of the situation at the 19:47</p> <p>18 time that you sent them? 19:47</p> <p>19 MR. MOONEY: Objection, form, compound. 19:47</p> <p>20 A As we discussed earlier, these were 19:47</p> <p>21 my speculations as to potential impact which would 19:47</p> <p>22 reflect my limited understanding at the time. 19:47</p> <p>23 Q Right, so at the time that you sent 19:47</p> <p>24 those Teams messages they reflected your limited 19:47</p> <p>25 understanding at the time of the Nuvia ALA? 19:47</p>	<p>1 transcript and video. 19:49</p> <p>2 MR. MOONEY: Counsel are both agreed 19:49</p> <p>3 they would like transcripts and videos of this 19:49</p> <p>4 deposition. 19:49</p> <p>5 MR. SHIUE: Quickly if possible. 19:49</p> <p>6 MS. ZAPPALA: Okay, thank you. 19:50</p> <p>7 THE VIDEOGRAPHER: Thank you. 19:50</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
Page 315	Page 317
<p>1 MR. MOONEY: Objection, form, vague. 19:48</p> <p>2 A I would say more than limited. [REDACTED] 19:48</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 Q But you sent messages reflecting 19:48</p> <p>6 what you understood the rights were under the 19:48</p> <p>7 Nuvia ALA, right, even though right now you say it 19:48</p> <p>8 is speculation? 19:48</p> <p>9 MR. MOONEY: Objection, form, vague, 19:48</p> <p>10 compound. 19:48</p> <p>11 A I speculated as to the potential 19:48</p> <p>12 impact, should certain outcomes occur without 19:48</p> <p>13 understanding or having viewed the Nuvia ALA. 19:48</p> <p>14 MS. ZAPPALA: No further questions. 19:48</p> <p>15 MR. MOONEY: Nothing further. 19:48</p> <p>16 THE VIDEOGRAPHER: Going off the record. 19:48</p> <p>17 The time is 19:46. End of media card number 19:48</p> <p>18 seven. End of the video deposition of Paul 19:48</p> <p>19 Williamson. 19:49</p> <p>20 Please can all parties state their 19:49</p> <p>21 transcripts or video orders for clarity, thank 19:49</p> <p>22 you. 19:49</p> <p>23 MR. MOONEY: I would like to order a 19:49</p> <p>24 transcript. 19:49</p> <p>25 MS. ZAPPALA: I would like to order a 19:49</p>	<p>1 CERTIFICATE OF WITNESS</p> <p>2</p> <p>3 I, Paul Williamson, am the witness in the</p> <p>4 foregoing deposition. I have read the foregoing</p> <p>5 statement and, having made such changes and</p> <p>6 corrections as I desired, I certify that the</p> <p>7 transcript is a true and accurate record of my</p> <p>8 responses to the questions put to me on Thursday,</p> <p>9 9 November, 2023.</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14 _____</p> <p>15 Paul Williamson</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

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Page 318

1 CERTIFICATE OF COURT REPORTER

2

3 I, AILSA WILLIAMS, an Accredited LiveNote
 4 Reporter, hereby certify that Paul Williamson was
 5 duly sworn, that I took the Stenograph notes of
 6 the foregoing deposition and that the transcript
 7 thereof is a true and accurate record transcribed
 8 to the best of my skill and ability. I further
 9 certify that I am neither counsel for, related to,
 10 nor employed by any of the parties to the action
 11 in which the deposition was taken, and that I am
 12 not a relative or employee of any attorney or
 13 counsel employed by the parties hereto, nor
 14 financially or otherwise interested in the outcome
 15 of the action.

16 Before completion of the deposition, review of the
 17 transcript was requested. Any changes made by the
 18 deponent (and provided to the reporter) during the
 19 period allowed are appended hereto.

20

21

22

23 AILSA WILLIAMS

24 Dated: 11/14/23

25

Page 319

1 ERRATA SHEET
 2 VERITEXT/NEW YORK REPORTING, LLC

3 CASE NAME: ARM Ltd. v. Qualcomm Inc., Et Al.

4 DATE OF DEPOSITION: 11/9/2023

5 WITNESSES' NAME: Paul Williamson

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(NOTARY PUBLIC)

MY COMMISSION EXPIRES:

Paul Williamson

SUBSCRIBED AND SWORN TO BEFORE ME

THIS ____ DAY OF _____, 20__.

81 (Pages 318 - 319)

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

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VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

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EXHIBIT 16

EXECUTED ON

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I. INTRODUCTION

1. Plaintiff Arm Ltd. (“Arm” or “Plaintiff”) has accused Defendants Qualcomm Inc., Qualcomm Technologies, Inc. (collectively, “Qualcomm”) and Nuvia, Inc. (“Nuvia”) (both collectively, “Defendants”) of breaching the Nuvia Architecture License Agreement (the “Nuvia ALA”).¹ More specifically, I understand Arm alleges that Nuvia was acquired by Qualcomm without Arm’s consent to assignment of the Nuvia ALA, and that Nuvia therefore breached

[REDACTED].² I understand that Arm further alleges [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As a remedy for Defendants’ breach of the Nuvia ALA, I understand that Arm seeks specific performance of [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

2. I have been retained as an expert on behalf of Arm to assess and provide testimony regarding whether damages are adequate to compensate Arm for the harm caused by Defendants’ breach of the Nuvia ALA. On December 20, 2023, I submitted an expert report

¹ Complaint, August 31, 2022, pp. 16 – 18.

² Complaint, August 31, 2022, pp. 10 – 11; ARM_00111064 – 080 at 078.

³ [REDACTED]

⁴ Complaint, August 31, 2022, pp. 13 – 16; ARM_00111064 – 080 at 077.

⁵ Complaint, August 31, 2022, pp. 16 – 18; ARM_00111064 – 080 at 077. I am informed and understand that Arm is not requesting that any silicon (physical computer chips) made before Qualcomm’s acquisition be destroyed, to the extent there are any.

containing my opinions (“Initial Report”). On February 27, 2024, Patrick F. Kennedy, Ph.D. issued his expert report (“Kennedy Report”) which includes his rebuttal opinions to my Initial Report. I have been asked to review the Kennedy Report and provide an assessment of Dr. Kennedy’s opinions and critiques. As stated in my Initial Report, I was asked to assume that Defendants are found liable for breach of the Nuvia ALA. I offer no opinion regarding liability.

3. My analysis, as set forth in this report, is based on information available to me as of the date of this report.

II. CREDENTIALS AND COMPENSATION

4. I am a Senior Managing Director of J.S. Held LLC (“J.S. Held”), a global consulting firm providing specialized technical, scientific, financial, and advisory services.⁶ I currently serve as the firm’s Intellectual Property Practice Lead. My credentials were detailed in my Initial Report. Attached as Schedule 1 to this report is a summary of my professional background and testifying experience, including all publications over the last ten years and all expert testimonies over the last four years.

5. J.S. Held is compensated for my team’s involvement in this matter based upon J.S. Held’s hourly billing rates. My time is currently billed at a rate of \$695 per hour. J.S. Held’s fee is not contingent upon the outcome of this litigation or the opinions that I express.

III. INFORMATION REVIEWED AND CONSIDERED

6. In connection with the preparation of this report, I have reviewed and considered information from a variety of sources, including documents and data produced by the parties; legal documents (and related exhibits); deposition testimony (and related exhibits); and publicly

⁶ J.S. Held and its affiliates and subsidiaries are not a certified public accounting firm and do not provide audit, attest, or any other public accounting services. J.S. Held is not a law firm and does not provide legal advice.

available information, articles, press releases, and Internet websites. The documents and other information that I have reviewed and considered as of the date of this report include those cited throughout this report (including the footnotes) as well as those listed on Schedule 2 attached to this report. I have also held discussions with Arm personnel, including Will Abbey (Executive Vice President & Chief Commercial Officer at Arm), Christine Tran (Senior Director of Legal at Arm), and Paul Williamson (Senior Vice President and General Manager of IoT Line of Business at Arm), as well as Arm's technical expert, Robert Colwell, Ph.D. In addition, I have reviewed and considered the following deposition transcripts (and related exhibits):⁷

Arm Personnel

- Will Abbey, Executive Vice President & Chief Commercial Officer
- Jonathan Armstrong, Head of Brand and Creative Services
- Lynn Couillard, Vice President of Sales
- Richard Grisenthwaite, Executive Vice President & Chief Architect
- Rene Haas, Chief Executive Officer
- Tim Herbert, Vice President of North American Sales (retired)
- Simon Segars, Former Chief Executive Officer
- Karthik Shivashankar, Senior Director of Wearables and Commercial Licensing
- Christine Tran, Senior Director of Legal
- Ian Thornton, Vice President of Investor Relations
- Paul Williamson, Senior Vice President and General Manager of IoT Line of Business
- Mark Werkheiser, Distinguished Engineer

Nuvia Personnel

- Lynn Bos, former Technical Program Manager
- Manu Gulati, former Founder & Senior Vice President of Engineering
- Pradeep Kanapathipillai, former CPU Microarchitecture and RTL Lead
- Nitin Sharma, former CPU Verification Engineer
- Jignesh Trivedi, former CPU Verification Engineer
- Gerard Williams, III, former Founder & Chief Executive Officer

⁷ Since the issuance of my Initial Report, I have received and reviewed the final deposition transcripts of those previously identified as rough transcripts in my Initial Report.

Qualcomm Personnel

- Cristiano Amon, President and Chief Executive Officer
- Ziad Asghar, Senior Vice President of Product Management
- Geeta Balakrishnan, Principal Engineer in the CAD Team
- Ramakrishna Chunduru, former Chief Procurement Officer
- Michael Roberts, Vice President of Global Marketing
- Laura Sand, Senior Vice President, Legal Counsel
- Rohit Singh, Director of Program Management
- James Thompson, Chief Technology Officer

7. In addition to the above, I have also reviewed and considered Dr. Kennedy's report, including the opinions, documents, and other information cited therein. In forming my opinions in this case, I have relied upon the information and documents identified in my Initial Report and this report, and I have also relied upon my more than 25 years of experience and expertise in analyzing remedies for misuse of intellectual property, analyzing the adequacy of damages to compensate for harms relating to the misuse of intellectual property, and assessing and calculating damages adequate to compensate for such harms. My analysis in this case is ongoing. Should additional information, such as documents or data provided by the parties, testimony, whether through expert report or deposition, or rulings issued by the Court, come to my attention after the date of this report, I may find it necessary to update or revise my analysis, opinions, and conclusions. I reserve my right to do so.

IV. LEGAL FRAMEWORK FOR DAMAGES

8. The legal framework for specific performance and damages and my understanding of same are set forth in my Initial Report and are unchanged.

V. SUMMARY OF OPINIONS

9. I have reviewed and considered the Kennedy Report as well as documents and information referenced by Dr. Kennedy. The Kennedy Report, including the documents and

information referenced by Dr. Kennedy, do not change the opinions expressed in my Initial Report.

VI. ASSESSMENT OF THE KENNEDY REPORT

A. Summary

10. The Kennedy Report sets forth numerous assertions in response to my Initial Report. Dr. Kennedy misunderstands or misrepresents the positions and support provided in my Initial Report and fails adequately to support his own opinions.

11. For example, Dr. Kennedy claims that “contrary to Mr. Schoettelkotte’s opinions, assuming a liability finding in favor of Arm, Arm’s damages are readily quantifiable with reasonable certainty, and such damages are adequate to compensate for Arm’s alleged harm if Arm is successful in proving its claims.”⁸ But Dr. Kennedy misrepresents my opinions and fails to support his own opinion, as summarized below.

- Dr. Kennedy fails to recognize that the harms discussed in my Initial Report are prospective and are not harms that have already occurred. As such, his reliance on an alleged lack of past harm and Arm’s current position is irrelevant. Arm’s public statements regarding past events and Arm’s current position, Arm personnel testimony regarding past events, Arm’s past valuations of its Nuvia relationship, and Arm’s past negotiations with Qualcomm do not establish that the prospective harms that I have identified in my Initial Report are unlikely to occur, or that any damages associated with any of those harms can be calculated with reasonable certainty and would be adequate to compensate Arm.
- Dr. Kennedy repeatedly approaches his analysis from the wrong frame of reference. His opinions are focused on the alleged value of Nuvia using Arm’s technology (not the proper analysis), rather than the harms caused by Qualcomm misusing Arm’s technology in an unlicensed manner that undermines the Arm licensing ecosystem.
- Dr. Kennedy does not provide any evidence showing that Arm’s licensing ecosystem would not be substantially harmed if Defendants are found liable for the breach of the Nuvia ALA but are not ordered to discontinue the use and distribution of [REDACTED]

⁸ Kennedy Report, p. 17.

██████████, and any products embodying such technology or information.

- Dr. Kennedy fails to demonstrate that the “available methodologies to quantify damages” that he identifies or any others (alone or in combination) are adequate to calculate damages for any of the harms identified in my Initial Report with reasonable certainty.
- Dr. Kennedy does not identify any specific formula, calculation, or quantitative or qualitative means that (alone or in combination) can be used to calculate the alleged damages associated with any of the harms identified in my Initial Report with reasonable certainty.
- Dr. Kennedy does not calculate, with reasonable certainty or otherwise, alleged damages that (alone or in combination with any other damages) are adequate to compensate Arm for any one or more of the harms identified in my Initial Report, or even identify a specific process and inputs for doing so.
- Dr. Kennedy’s position that damages adequate to compensate Arm can be calculated with reasonable certainty is undermined by the fact that he fails to calculate *any* damage amounts for any one or more of the alleged harms (or any portion(s) of those harms) identified in my Initial Report.
- Dr. Kennedy’s critiques of my Initial Report are unpersuasive, unsupported, and incorrect. Dr. Kennedy mischaracterizes the opinions in my Initial Report and makes numerous incorrect or unsupported statements as a result.

12. Throughout the remainder of this report, I provide my assessment of the discussion and conclusions set forth in the Kennedy Report. Any lack of specific criticism is not meant to imply and is not agreement with Dr. Kennedy’s opinions and conclusions.

B. Arm Public Statements Identified By Dr. Kennedy Do Not Address Prospective Harms

13. Dr. Kennedy’s first rebuttal section reveals Dr. Kennedy’s fundamental misunderstanding of my Initial Report. Specifically, Dr. Kennedy states that “Arm alleges the Defendants’ actions have caused it harm, but Arm’s public statements do not identify the

purported harms that are the subject of Mr. Schoettelkotte's report."⁹ Further, Dr. Kennedy states that "Mr. Schoettelkotte fails to acknowledge these public statements and nowhere addresses the fact that these statements contradict Mr. Schoettelkotte[s] allegations of harm."¹⁰ However, as my Initial Report plainly stated:

[i]n my opinion, if Defendants are found liable for breach of the Nuvia ALA but are not ordered to discontinue the use and distribution of [REDACTED], and any products embodying such technology or information (including Nuvia-based Cores), then monetary damages are not adequate to compensate Arm for the harm (including future harm) caused by Defendants' breach of the Nuvia ALA. In my opinion, the monetary damages associated with the harm to Arm (including future harm) caused by Defendants' breach of the Nuvia ALA cannot be determined with reasonable certainty.

I have considered the harms that Defendants' breach of the Nuvia ALA may cause to Arm, based on my discussions with Arm employees and review of the record, and described those harms [in my Initial Report].¹¹

14. Given that Arm's request for specific performance has not been addressed by the Court and denied, the harms discussed in my Initial Report have not yet transpired. As such, the examples cited by Dr. Kennedy focusing on the existence of past harms are inapplicable and do not refute the prospective harms identified in my Initial Report.

15. Dr. Kennedy claims that:

Arm's public statements since the Defendants' alleged breach portray increasing royalty revenue, market share, and strength in Arm's ecosystem. These public statements of financial health and affirming the strength of Arm's licensing ecosystem—which postdate Defendants' alleged breach of the Arm / Nuvia ALA—contradict the notion that Arm has been damaged to date, and Arm has not made any public disclosure of the type and extent of the harm suggest by Mr. Schoettelkotte.¹²

The Kennedy Report then references various public statements by Arm—none of which relate to

⁹ Kennedy Report, p. 19.

¹⁰ Kennedy Report, p. 19.

¹¹ Initial Report, p. 32.

¹² Kennedy Report, p. 19.

the harm that would result from a denial of Arm's request for specific performance.¹³

16. Dr. Kennedy concludes that:

[w]hile Mr. Schoettelkotte opines that Arm has and will suffer irreparable harm, Arm's statements to the public and public-facing documents contradict the type and scope of past or prospective future harm claimed by Mr. Schoettelkotte. In its public statements and filings, Arm repeatedly highlights its strong financial performance, robust licensing position, and its plans for future growth and does not mention any significant weaknesses.¹⁴

Dr. Kennedy's conclusion simply highlights his misunderstanding of the harms identified in my Initial Report. Notably, Dr. Kennedy ignores and does not consider Arm's public statements that identified material prospective harms that could result from this dispute. Specifically, Dr. Kennedy did not include in his list public statements in Arm's Form F-1 filing that "[w]e have experienced, and may in the future experience, significant fluctuations in our period-to-period results of operations. Our results may fluctuate and be unpredictable because of a variety of factors, including, among others:" "new litigation or developments in current litigation, including, but not limited to, a lawsuit with Qualcomm and Nuvia...."¹⁵ Further, Arm described the litigation with Qualcomm and indicated that "[o]ur complaint seeks, among other things, specific performance of the Nuvia ALA termination provisions to require Qualcomm and Nuvia to stop using and destroy the relevant Nuvia technology...."¹⁶ Arm also stated that "[w]e can provide no assurances regarding the outcome of the litigation, or how the litigation will affect our relationship with Qualcomm, which is currently a major customer of ours and accounted for 11% of our total revenue for the fiscal year ended March 31, 2023."¹⁷ Arm also indicated that

¹³ Kennedy Report, pp. 20 – 24.

¹⁴ Kennedy Report, p. 24.

¹⁵ ARM_01259705 – 0105 at 735 – 736.

¹⁶ ARM_01259705 – 0105 at 754.

¹⁷ ARM_01259705 – 0105 at 754.

“because litigation and the outcome of regulatory proceedings are inherently unpredictable, our business, results of operations, financial condition and prospects could be materially adversely affected by an unfavorable resolution of one or more of these proceedings, claims, demands or investigations.”¹⁸ As such, Dr. Kennedy’s claim that “Arm’s statements to the public and public-facing documents contradict the type and scope of past or prospective future harm claimed by Mr. Schoettelkotte” is incorrect.¹⁹ A full consideration of Arm’s public statements only emphasizes the gravity of the potential harm to Arm considering its recent statements regarding the “strong financial performance, robust licensing position, and its plans for future growth” as described by Dr. Kennedy.

17. The public statements identified by Dr. Kennedy relate to past events and do not address the prospective harms raised in my Initial Report. As such, Dr. Kennedy fails to indicate the relevance of the public statements for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. As such, the public statements cited by Dr. Kennedy do not support his assertion that damages (as an alternative to specific performance) can be calculated with reasonable certainty or would be adequate to compensate Arm.

18. While questioning the veracity of the harms identified in my Initial Report based on Arm’s statements in its public filings, Dr. Kennedy also ignores that Qualcomm has also recognized in its public filings many of the same types of prospective threats to its own licensing ecosystem.

19. For example, Qualcomm has also identified the risk of potential re-negotiations of

¹⁸ ARM_01259705 – 0105 at 754.

¹⁹ Kennedy Report, p. 24.

its license agreements as a result of legal proceedings.²⁰ Specifically, Qualcomm has stated that it could be “required to reduce the royalty rates in [its] patent license agreements” as well as changes requiring the modification or renegotiation of its “existing license agreements or pursuing other commercial arrangements.”²¹ Along with the risk of renegotiation, Qualcomm also identified the potential for transaction costs, stating:

[t]o the extent we are required to implement any of these licensing and/or business practices, including by modifying or renegotiating our existing license agreements or pursuing other commercial arrangements, *we would incur additional transaction costs, which may be significant*, we could incur delays in recognizing revenues until license negotiations were completed, and our business, revenues, results of operations, cash flows and financial condition could be harmed.²²

20. Qualcomm also identifies in its own public filings the importance of its R&D as well as the link to its future success. For example, Qualcomm states that “[w]hile we continue to invest significant resources toward advancements primarily in support of 5G-based technologies, we also invest in new and expanded product areas, and industries and applications beyond mobile handsets, but utilizing our existing technical and business expertise and through acquisitions or other strategic transactions.”²³ Qualcomm further stated that “[i]n particular, *our future growth depends in part on new and expanded product areas, and industries and applications beyond mobile handsets..... Accordingly, we intend to continue to make substantial investments in these new and expanded product areas, industries and applications, and in developing related products and technologies.*”²⁴ Qualcomm also highlighted the impact on its future success if its efforts “on new and expanded product areas” are not successful, stating:

²⁰ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, pp. 28 – 29.

²¹ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 29.

²² Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 29 (emphasis added).

²³ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 21.

²⁴ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 21 (emphasis added).

[i]f we are *not successful* in extending our technologies and products into new and expanded areas, and industries and applications beyond mobile handsets, if our new technologies and products are not successful, or if we are not successful in the time frames we anticipate, we may incur significant costs and asset impairments, *our business and revenues may not grow or grow as anticipated, our revenues and margins may be negatively impacted, our stock price may decline and our reputation may be harmed.*²⁵

21. In addition, Qualcomm indicated that a reduction in revenue would hinder its resources for research and development:

[t]he loss of any one of our significant customers, a reduction in the purchase of our products by any of these customers or the cancellation of significant purchases by any of these customers,...would reduce our revenues and could harm our ability to achieve or sustain expected results of operations. A delay of significant purchases, even if only temporary, would reduce our revenues in the period of the delay. *Any such reduction in revenues would also impact our cash resources available for other purposes, such as research and development.*²⁶

22. In addition, Qualcomm recognized that the misuse of its intellectual property could cause it reputational harm as well. Specifically, Qualcomm stated:

[t]he misappropriation, theft, misuse, disclosure, loss or destruction of the technology, intellectual property, or the proprietary, confidential or personal information, of us or our employees, customers, licensees, suppliers or third parties, could harm our competitive position, reduce the value of our investment in research and development and other strategic initiatives, cause us to lose business, *damage our reputation*, subject us to legal or regulatory proceedings, cause us to incur other loss or liability and otherwise adversely affect our business.²⁷

23. Qualcomm's identification of many of the types of prospective threats and harms to its licensing ecosystem that were discussed in my Initial Report further supports the opinions set forth in my Initial Report. This is because Qualcomm has itself acknowledged through public

²⁵ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 21 (emphasis added).

²⁶ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 19 (emphasis added).

²⁷ Qualcomm Incorporated Form 10-K for the fiscal year ended September 24, 2023, p. 26 (emphasis added).

statements that the types of harms which Arm identified are of a similar risk to its own business.

24. Additional public statements and statements from regulators support the importance of Arm's licensing ecosystem and corroborate the harms identified in my Initial Report. For example, a complaint filed by the FTC in 2021 states that:

Arm Processor Technology is at the foundation of many innovative products of our modern digital age, including nearly every smartphone on the market, advanced driver assistance features in recent and upcoming cars, web servers that can provide significantly better cost performance over the most comparable non-Arm servers, and many other examples. In these products, Arm Processor Technology is a critical input. The wide deployment of Arm's Processor Technology has fostered a vibrant ecosystem of software and hardware developers, software, and devices.²⁸

C. Testimony Identified By Dr. Kennedy Does Not Address Prospective Harms

25. Continuing his apparent misunderstanding of my Initial Report, Dr. Kennedy states that "[n]ot only do Arm's public statements indicate that Arm has not been harmed, Arm's witnesses, including those Mr. Schoettelkotte relies on heavily in his report, testified that no actual harm has been experienced by Arm. These statements by Arm's own personnel contradict allegations that Arm has been harmed."²⁹ Dr. Kennedy goes on to cite and discuss testimony from Arm personnel related to the existence of *past* harm, at the time of their depositions, with Arm's lawsuit pending and the Court yet to rule on specific performance.³⁰ Dr. Kennedy ignores the testimony discussed in my Initial Report that relates to the *future* harms that may flow from a denial of Arm's request for specific performance. Dr. Kennedy's focus on the existence of *past* harm is irrelevant. As discussed in my Initial Report, the harm to Arm is *prospective*, and evidence of that prospective harm is not contradicted or undermined by Arm witness testimony regarding

²⁸ Complaint, In the Matter of Nvidia Corporation, Softbank Group Corporation, and Arm, Ltd., Docket No. 9404, Federal Trade Commission, December 2, 2021, p. 2 (https://www.ftc.gov/system/files/documents/cases/d09404_part_3_complaint_public_version.pdf).

²⁹ Kennedy Report, p. 24.

³⁰ Kennedy Report, pp. 24 – 26.

past harm. Dr. Kennedy also ignores testimony by Arm witnesses, cited below and in my Initial Report, showing the likelihood of the prospective harms to Arm's licensing ecosystem if specific performance is not ordered in this case.

26. For example, as cited in my Initial Report, Mr. Williamson testified concerning [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]³¹ Mr. Williamson further testified that [REDACTED]

[REDACTED]

27. Mr. Abbey also stated that [REDACTED]

[REDACTED]

[REDACTED]³⁴ Further, Mr. Abbey testified that [REDACTED]

[REDACTED]

[REDACTED] Mr. Williamson testified that

[REDACTED]

[REDACTED]

[REDACTED]³⁶ Similarly,

³¹ Deposition of Paul Williamson, November 9, 2023, pp. 243 – 244.

³² Deposition of Paul Williamson, November 9, 2023, p. 244.

³³ Deposition of Paul Williamson, November 9, 2023, pp. 244 – 245.

³⁴ Deposition of Will Abbey, October 27, 2023, p. 361.

³⁵ Deposition of Will Abbey, October 27, 2023, p. 361.

³⁶ Deposition of Paul Williamson, November 9, 2023, p. 246.

Mr. Williamson testified that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] ■ Mr. Haas testified that [REDACTED]

[REDACTED]

[REDACTED] 8

28. In sum, the testimony identified by Dr. Kennedy largely relates to past events and does not address the prospective harms raised in my Initial Report. Dr. Kennedy fails to indicate the relevance of the testimony for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. As such, the testimony cited by Dr. Kennedy does not support that the damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

D. Dr. Kennedy's Claim of Purported Benefit of [REDACTED] Launch Is Misguided

29. Dr. Kennedy claims that "[w]hile Arm alleges that the Defendants' alleged breach has caused harm, Qualcomm's development efforts and business plans related to the development of custom Arm-compliant CPUs in certain markets will actually benefit Arm. Specifically, Qualcomm's development efforts of its Arm-compatible [REDACTED] CPU cores ([REDACTED]) will likely lead to increased royalties for Arm. Mr. Schoettelkotte ignores this in his report."³⁹ Dr. Kennedy subsequently identifies discussion of Qualcomm's intention to enter the PC market with the [REDACTED]. Dr. Kennedy concludes that "any market share that

³⁷ Deposition of Paul Williamson, November 9, 2023, p. 246.

³⁸ Deposition of Rene Haas, December 12, 2023, pp. 164 – 165.

³⁹ Kennedy Report, p. 26.

Qualcomm gains in the PC market is market share gained for Arm versus x86 alternatives. Further, Qualcomm's sales of [REDACTED] will generate royalties for Arm under the Arm / Qualcomm ALA. Therefore, Qualcomm's development of the [REDACTED] will generate additional royalties for Arm from an increased volume of shipments for the PC market."⁴⁰

30. As discussed in my Initial Report, I understand that [REDACTED]

[REDACTED]⁴¹ Further, I understand that the [REDACTED]

[REDACTED] Dr. Kennedy fails to recognize the significance that [REDACTED]

[REDACTED]. As such, the impending launch of the [REDACTED], should the court not order specific performance, is an event signaling to Arm's licensing ecosystem and the market more broadly that [REDACTED]⁴³ leading to the harms that are addressed in my Initial Report.

31. In sum, the alleged benefit of [REDACTED] sales identified by Dr. Kennedy does not address the prospective harms raised in my Initial Report. Dr. Kennedy fails to indicate the relevance of this alleged benefit for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm for harms beyond

⁴⁰ Kennedy Report, p. 30.

⁴¹ Correspondence dated 10/26/2023, email from J. Braly to J. Li; Deposition of Mike Roberts, November 28, 2023, pp. 35 - 37.

⁴² ARM_01238999 - 9003; *see also* ARM_01215997 - 6001 at 997 [REDACTED]

QCARM_2417783 [REDACTED]

⁴³ Deposition of Will Abbey, October 27, 2023, p. 361.

any Oryon royalties. That is, even if Arm may receive royalties for [REDACTED], those royalties must be offset by the many-faceted and interconnected types of harm to Arm identified in my Initial Report, which Dr. Kennedy has not calculated, let alone shown would be net positive when considering [REDACTED] royalties (as his opinions implicitly assume). As such, the alleged benefit raised by Dr. Kennedy does not support that the damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

E. Dr. Kennedy's Asserted Examples of Quantified Damages Are Not Applicable

32. Dr. Kennedy states that "Mr. Schoettelkotte contends that damages cannot be quantified, while ignoring the extensive evidence that Arm has expended time and effort quantifying what it sought as adequate compensation."⁴⁴ Dr. Kennedy identifies two instances in which he alleges that Arm has quantified "damages":

- [REDACTED]

- [REDACTED]

- i. [REDACTED]

33. [REDACTED]

[REDACTED]

[REDACTED]⁴⁷ Dr. Kennedy

goes on to identify several Arm documents regarding the Arm / Nuvia negotiations and Arm's

⁴⁴ Kennedy Report, p. 31.

⁴⁵ Kennedy Report, p. 31.

⁴⁶ Kennedy Report, p. 33.

⁴⁷ Kennedy Report, p. 31.

analysis of the Nuvia relationship in 2019.⁴⁸

34. [REDACTED] identified by Dr. Kennedy are irrelevant as they do not address the prospective harms raised in my Initial Report from Qualcomm proceeding with unlicensed technology. Dr. Kennedy fails to indicate the relevance of these amounts for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. Indeed, [REDACTED] [REDACTED] As such, [REDACTED] [REDACTED] do not support that damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

ii. [REDACTED]

35. Dr. Kennedy states that he [REDACTED] [REDACTED] [REDACTED]⁴⁹ Dr. Kennedy then discusses several internal Arm documents related to its assessment of the [REDACTED].⁵⁰ Dr. Kennedy concludes that [REDACTED] [REDACTED] [REDACTED]⁵¹

36. [REDACTED] identified by Dr. Kennedy are irrelevant as they do not address the prospective harms raised in my Initial Report from the failure to reach a deal and the

⁴⁸ Kennedy Report, pp. 31 – 33.

⁴⁹ Kennedy Report, p. 33.

⁵⁰ Kennedy Report, pp. 33 – 35.

⁵¹ Kennedy Report, p. 35.

impact on Arm from Qualcomm proceeding with unlicensed technology. Dr. Kennedy fails to indicate the relevance of these amounts for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. Further, while describing the [REDACTED] as “inflated,” Dr. Kennedy provides no explanation as to why the amounts are allegedly “inflated.” As such, [REDACTED] do not support that the damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

iii. Arm’s Negotiations With Qualcomm Are Not Applicable

37. Dr. Kennedy states that “Arm sought payment from Qualcomm in connection with the Nuvia acquisition in the form of [REDACTED]. Arm and Qualcomm engaged in extensive back and forth negotiations regarding Arm’s request for compensation in connection with the acquisition.”⁵² Dr. Kennedy then discusses documents regarding negotiations between Arm and Qualcomm that included various proposed royalty rates (based on market segments), proposed assignment fees, and proposed transition fees—all of which would have been related to Qualcomm’s continued use of Arm’s technology in an authorized/licensed manner.⁵³

38. Dr. Kennedy states that “[REDACTED] address issues at play in this litigation, and, therefore, demonstrate that Arm has been able to attach a monetary value to the issues in this litigation.”⁵⁴ Dr. Kennedy further states that:

⁵² Kennedy Report, p. 35.

⁵³ Kennedy Report, pp. 35 – 41; ARM_00086285 – 293; QCARM_3537713 – 715; QCARM_3535535 – 536; QCARM_7434227 – 229; ARM_01305785 – 789; ARM_00000017 – 018.

⁵⁴ Kennedy Report, p. 41.

[t]he relevant issue here is not whether Arm's [REDACTED] is correct, but instead that Arm was able to calculate a value that it used in negotiations to seek compensation for Qualcomm's alleged use of the Nuvia-based designs, thus illustrating that the value of the Nuvia agreement could be monetized and calculated. Yet, Mr. Schoettelkotte ignores this evidence of valuation.⁵⁵

39. Dr. Kennedy's discussion and conclusion of the amounts from the negotiations demonstrate his misunderstanding of my Initial Report and Arm's claims in this matter.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In fact, in an email exchange cited by Dr. Kennedy, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵⁵ Kennedy Report, p. 42.

⁵⁶ QCARM_3537713 - 715 at 713.

[REDACTED]

40. As a final matter, I understand there may be a dispute regarding the admissibility of the documents related to these negotiations. As such, I have included the response above solely to address Dr. Kennedy's discussion of these documents to the extent the Court were to allow any of this information to be considered or addressed by experts in this case.

41. As discussed above, the negotiation amounts identified by Dr. Kennedy are irrelevant as they do not address the prospective harms raised in my Initial Report. Dr. Kennedy fails to indicate the relevance of these amounts for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. As such, the amounts identified by Dr. Kennedy do not support that damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

F. The “Available Methodologies to Quantify Damages” Identified By Dr. Kennedy Are Not Supported Or Applicable

42. Dr. Kennedy states that “Mr. Schoettelkotte ignores that, even if Arm had not attached a value to the issues in this litigation [], there are well established methodologies that could be used to calculate damages[]: (1) quantification of the alleged head start damages, and (2) utilization of previous design transfer fees as a proxy for adequate compensation.”⁵⁷ As discussed below, Dr. Kennedy fails to demonstrate that either of these “available methodologies” address the harms identified in my Initial Report, that they can be used to determine damages for such harms with reasonable certainty, or that they would be adequate to compensate Arm.

i. Dr. Kennedy’s “Head Start” Methodology Is Unsupported And Does Not Address Harms At Issue

43. Dr. Kennedy states that “Arm alleges that Qualcomm received a head start by using certain Arm intellectual property. That is, Qualcomm was allegedly able to save development time and will be able to commercialize its custom CPUs for certain market segments earlier than it otherwise would have. For head start damages in this litigation, this benefit, (i.e., Qualcomm’s head start) would be tied to its alleged improper use of certain technology as opposed to other independent development efforts.”⁵⁸ Dr. Kennedy also states that “[i]n this matter, the financial consequence of Qualcomm’s alleged head start to Arm would be that Qualcomm will shift from [REDACTED] earlier than it otherwise would have for certain market segments.”⁵⁹

44. Dr. Kennedy asserts that “[o]nce the head start period is determined, the specific calculation of damages would flow directly from the application of royalty rates to units sold over the appropriate head start period. Further, because Qualcomm intends to release its custom

⁵⁷ Kennedy Report, p. 45.

⁵⁸ Kennedy Report, p. 45.

⁵⁹ Kennedy Report, pp. 47 – 48.

CPU products in various market segments at different times, and because of the dynamics that are unique to each market segment, Qualcomm's alleged head start and Arm's resulting damages, if any, would need to be quantified on a market-by-market basis...."⁶⁰ Dr. Kennedy further claims that "these [head start] damages would provide adequate compensation to Arm as it ties the alleged harm (i.e., lost royalties) back to the specific alleged wrongful conduct (i.e., Defendants' breach and alleged improper use of Arm's intellectual property)."⁶¹

45. Dr. Kennedy is incorrect. Dr. Kennedy approaches damages in this matter as if Arm's claim was one for misappropriation of trade secrets.⁶² However, as indicated at the beginning of my Initial Report and this report, I understand this matter relates to the Defendant's alleged breach of the Nuvia ALA and the impact of the court denying Arm's request for specific performance. As such, Dr. Kennedy is not addressing the relevant harms as identified in my Initial Report.

46. Critically, Dr. Kennedy has not demonstrated that the "head start" methodology described in his report can be used to calculate damages associated with all the harms to Arm addressed in my Initial Report (let alone with reasonable certainty) or would be adequate to compensate Arm for those harms that are distinct from the benefit to Qualcomm from any head start.

47. In conjunction with the fact that Dr. Kennedy's "head start" methodology does not properly address the prospective harms identified in my Initial Report, he fails to include a calculation demonstrating the viability of the methodology he purports to be appropriate. Indeed, Dr. Kennedy claims his "head start" methodology "can be calculated with reasonable

⁶⁰ Kennedy Report, p. 53.

⁶¹ Kennedy Report, pp. 56 – 57.

⁶² Indeed, Dr. Kennedy cites to a treatise entitled "*Commentary on Monetary Remedies in Trade Secret Litigation*."

certainty.”⁶³ Yet, Dr. Kennedy has not proven that to be the case by employing the methodology he asserts is appropriate. Indeed, public statements made by Mr. Amon indicate that the benefit to Qualcomm and resultant harm to Arm from a head start due to Nuvia is not easily quantifiable. In April 2021, Mr. Amon stated “The NUVIA asset give[s] us a lot of flexibility. You should think about it as having a scalable leading CPU asset to together with the other Qualcomm assets.”⁶⁴ Mr. Amon further stated that “the transition across the board to ARM architecture really create[s] a big expansion opportunity for Qualcomm, and we're very focused to make that happen with a leading position leveraging the NUVIA CPU. Having said that, I think this asset gives us a lot of flexibility to continue to be expanding to all the different business vectors we're building in the company.”⁶⁵

48. As discussed above, Dr. Kennedy's “head start” methodology is irrelevant as it does not address the prospective harms raised in my Initial Report. Dr. Kennedy fails to indicate the relevance of this methodology for determining or quantifying the scope of the prospective harms identified in my Initial Report, and whether the damages associated with those harms can be determined with reasonable certainty and would adequately compensate Arm. As such, the “head start” methodology identified by Dr. Kennedy does not support that damages associated with the harms to Arm if its request for specific performance is denied can be calculated with reasonable certainty or would be adequate to compensate Arm.

ii. Dr. Kennedy's “Design Transfer Fee” Methodology Is Unsupported And Does Not Address Harms At Issue

49. Dr. Kennedy states that [REDACTED]

⁶³ Kennedy Report, p. 56.

⁶⁴ <https://seekingalpha.com/article/4422252-qualcomm-incorporateds-qcom-ceo-steve-mollenkopf-on-q2-2021-results-earnings-call-transcript>.

⁶⁵ <https://seekingalpha.com/article/4422252-qualcomm-incorporateds-qcom-ceo-steve-mollenkopf-on-q2-2021-results-earnings-call-transcript>.

[REDACTED]

[REDACTED]

[REDACTED].”⁶⁶ Dr. Kennedy

further claims that “[REDACTED]

[REDACTED]⁶⁷ In addition,

Dr. Kennedy concludes that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]”⁶⁸

50. As with his “head start” assessment, Dr. Kennedy has not demonstrated that the “design transfer fee” methodology can adequately compensate Arm for the types of harms enumerated in my Initial Report. Further, Dr. Kennedy does not demonstrate that the “design transfer free” methodology can compensate for the harms discussed in my Initial Report with reasonable certainty. Specifically, Dr. Kennedy has not shown how his “design transfer fee” methodology addresses the facts of this case. As discussed previously in this report and in my Initial Report, a denial of specific performance would signal to Arm’s licensing ecosystem and the market more broadly that licensees [REDACTED]⁶⁹ leading to the harms that are addressed in my Initial Report. Nothing in the Kennedy Report indicates that Dr. Kennedy’s “design transfer fee” methodology would address these harms, in particular because he fails to identify a specific amount or perform an analysis of how said design transfer fee would compensate for the harms identified in my Initial Report.

⁶⁶ Kennedy Report, p. 57.

⁶⁷ Kennedy Report, p. 57.

⁶⁸ Kennedy Report, p. 59.

⁶⁹ Deposition of Will Abbey, October 27, 2023, p. 361.

51. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁷⁰ Kennedy Report, p. 45.

G. Dr. Kennedy's Various Critiques Of My Initial Report Are Unpersuasive, Unsupported, And Incorrect

54. The remaining portion of the Kennedy Report includes various critiques of sections of my Initial Report. As an initial matter, I note that throughout his report, Dr. Kennedy mischaracterizes the opinions set forth in my Initial Report (and reiterated above in this report).⁷¹ Below I address certain of Mr. Kennedy's assessments. As previously stated in this report, any lack of specific criticism is not meant to imply and is not agreement with Dr. Kennedy's opinions and conclusions.

i. Arm's "Systemic and Idiosyncratic Risks" Do Not Discount Harms From Defendants

55. Dr. Kennedy claims that "Mr. Schoettelkotte conflates Arm's systemic and idiosyncratic risks with risk purportedly associated only with Qualcomm's alleged actions. However, many of Arm's purported harms exist simply due to the nature of Arm's business, and Mr. Schoettelkotte has not differentiated the harms purportedly due to Defendants' alleged wrongful conduct from harms that are due to the nature of Arm's inherent business risks."⁷² Dr. Kennedy makes similar claims throughout his report, such as the examples below.

- "Mr. Schoettelkotte fails to distinguish existing and prospective licensees' possible demand for lower royalties that could occur in the normal course of business, versus the demand for 'more favorable terms' that he identifies as purported harm to Arm."⁷³
- "Based on Arm's own submissions to the SEC, CMA, and FTC, it is evident

⁷¹ See, e.g., Kennedy Report, pp. 62, 70, 73 – 75, 81 – 82, and 92 – 95.

⁷² Kennedy Report, p. 61.

⁷³ Kennedy Report, p. 64.

that Arm encounters attempts by licensees to renegotiate the terms of the existing license agreements in the normal course of business, and such activity occurs separately from Defendants' alleged actions."⁷⁴

- "Mr. Schoettelkotte's opinions fail to differentiate between activity and business risks that occur in the normal course of Arm's business and what he claims is wrongful conduct by Defendants."⁷⁵
- "This competitive environment is not a purported harm, but rather a general business risk that exists within Arm's business model, including granting rights under ALAs to Qualcomm and to other manufacturers."⁷⁶
- "Thus, the potential impact to Arm's revenues and R&D from a competing custom CPU pre-dates Qualcomm's acquisition of Nuvia and Mr. Schoettelkotte fails to account for the risk Arm faces from ALA agreements in general, unrelated to the claims made against Defendants in this matter."⁷⁷

56. Dr. Kennedy fails to recognize that while the prospective harms addressed in my Initial Report are not unlike some of the risks identified by Arm in its public statements, the harms discussed in my Initial Report would be tied to a denial of specific performance and are over and above any "systemic and idiosyncratic" risks Arm has otherwise identified in its public statements (if Qualcomm proceeds with unlicensed technology, it will exacerbate those types of harm, along with imposing others). Further, Dr. Kennedy fails to recognize the impact of the prospective harms identified in my Initial Report because they are related to the actions of one of Arm's largest licensees flouting Arm's license agreement (in the event specific performance is denied). Notably, Dr. Kennedy's above cited examples do not reflect that Arm has addressed the impacts that may result from this matter in its public filings, as discussed previously in this report and my Initial Report.

⁷⁴ Kennedy Report, pp. 65 – 66.

⁷⁵ Kennedy Report, p. 73.

⁷⁶ Kennedy Report, pp. 75 – 76.

⁷⁷ Kennedy Report, p. 93.

ii. Dr. Kennedy Incorrectly Interprets RISC-V Threat

57. Regarding RISC-V, Dr. Kennedy states that [REDACTED]

[REDACTED] ⁷⁸ Dr. Kennedy appears to be making a claim that is not stated in my Initial Report. Nowhere in my Initial Report do I state [REDACTED]. Further, Dr. Kennedy asserts that there is a contradiction in my Initial Report.⁷⁹ However, this is yet another misunderstanding (or mischaracterization) on Dr. Kennedy's part. [REDACTED]

58. Dr. Kennedy indicates that "[REDACTED]

[REDACTED] ⁸⁰ In support of his statement, Dr. Kennedy identifies [REDACTED]

[REDACTED] ⁸¹ Based on these documents, Dr. Kennedy concludes that [REDACTED]

[REDACTED] ⁸² On this conclusion, Dr. Kennedy and I agree. Yet, the harm discussed in my Initial Report is related to *prospective* harm that would arise if Arm's request for specific performance is denied.

⁷⁸ Kennedy Report, p. 79.

⁷⁹ Kennedy Report, pp. 79 – 80.

⁸⁰ Kennedy Report, p. 80.

⁸¹ Kennedy Report, pp. 80 – 81; ARM_01282466 – 575; ARM_00120530 – 536.

⁸² Kennedy Report, pp. 80 -81.

59. As noted in my Initial Report, “[REDACTED]

[REDACTED]

[REDACTED]”⁸³ Further, as the documents cited by

Dr. Kennedy illustrate, [REDACTED]

However, [REDACTED]

[REDACTED]

[REDACTED] For example, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]”⁸⁴ Further, the document indicated that a [REDACTED]

[REDACTED]⁸⁵ Specifically, the document noted that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁸⁶ Notably the document indicated that [REDACTED]

[REDACTED]

[REDACTED] ■ [REDACTED]

[REDACTED]

[REDACTED]

iii. Dr. Kennedy Misunderstands Arm’s “First Mover Advantage”

60. Dr. Kennedy claims:

⁸³ Initial Report, pp. 43 – 44.

⁸⁴ ARM_00120530 – 536 at 532.

⁸⁵ ARM_00120530 – 536 at 531.

⁸⁶ ARM_00120530 – 536 at 531.

⁸⁷ ARM_00120530 – 536 at 535.

[REDACTED]

88

Further, Dr. Kennedy states that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]”⁸⁹

61. Dr. Kennedy’s misunderstanding is perplexing. My Initial Report identifies the mobile phone segment numerous times in describing Arm’s first mover advantage and how that advantage might translate to other segments, [REDACTED]

[REDACTED]

[REDACTED].⁹⁰ Dr. Kennedy even identifies Arm’s prevalence of “[REDACTED]

[REDACTED]”⁹¹ However, Dr. Kennedy then goes on to discuss his view regarding Arm’s loss of its first mover advantage being “inconsistent with history.”⁹² But given Dr. Kennedy’s misunderstanding of the first mover advantage discussed in my Initial Report, his conclusions do not apply.

iv. Dr. Kennedy’s Assessment Of Arm’s Research and Development Is Unsupported

62. Dr. Kennedy claims that “[REDACTED]

[REDACTED]⁹³ Dr. Kennedy’s assertion is particularly surprising given that Arm states in its public filings that it “architect[s], develop[s], and license[s] high-

⁸⁸ Kennedy Report, p. 81.

⁸⁹ Kennedy Report, p. 83.

⁹⁰ Initial Report, pp. 45 – 47.

⁹¹ Kennedy Report, p. 83.

⁹² Kennedy Report, p. 83.

⁹³ Kennedy Report, p. 92.

performance, low-cost, and energy-efficient CPU products and related technology” (*i.e.*, does not manufacture a product) and that R&D “is at the heart of [its] business and critical to [its] future success.”⁹⁴ Indeed, [REDACTED]

[REDACTED]

[REDACTED]⁹⁵ Further, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

63. As such, Dr. Kennedy’s claim that Arm’s R&D activities are not tied to its revenues is unsupported given the magnitude of Arm’s R&D expenses as percentage of revenue and how it compares to other companies in the industry.

v. Dr. Kennedy’s Assessment Of Harm To Goodwill Is Incorrect

64. Dr. Kennedy claims that “from a damages perspective, harm to goodwill is a quantitative conclusion based upon the financial impact that an event has on a business’s ability to generate future profit.”^{96,97} Dr. Kennedy further states that “Arm’s public disclosures state that it has identified ‘no indication of impairment’ to its goodwill over its last three fiscal years.”⁹⁸ Finally, Dr. Kennedy states that “Mr. Schoettelkotte presents no analytical or quantitative foundation for the claim that Arm’s brand and reputation has been damaged or will be imminently damaged as a result of the Defendant’s alleged breach, and his claims are

⁹⁴ ARM_01259705 – 0105 at 712 and 804.

⁹⁵ See Schedules 3 and 4.

⁹⁶ Kennedy Report, p. 94.

⁹⁷ I note that the cited pages to the *Litigation Services Handbook* do not support Dr. Kennedy’s statement.

⁹⁸ Kennedy Report, p. 94.

contradicted by Arm’s public disclosures in its SEC filings.”⁹⁹

65. Due to Dr. Kennedy’s misunderstanding of my Initial Report, he has focused on *past* events rather than the *prospective* harm related to Arm’s goodwill if Qualcomm were permitted to proceed with unlicensed technology. As such, Dr. Kennedy’s stating that Arm has not identified any “indication of impairment” to its goodwill over the last three years is irrelevant. Rather, contrary to Dr. Kennedy’s assertion, Arm’s public disclosures *have* identified the potential harm due to the dispute at issue. Notably, in its Form F-1 filing, Arm stated “[w]e have experienced, and may in the future experience, significant fluctuations in our period-to-period results of operations. Our results may fluctuate and be unpredictable because of a variety of factors, including, among others:” “new litigation or developments in current litigation, including, but not limited to, a lawsuit with Qualcomm and Nuvia...”¹⁰⁰ Further, Arm described the litigation with Qualcomm and indicated that “[w]e can provide no assurances regarding the outcome of the litigation, or *how the litigation will affect our relationship with Qualcomm*, which is currently a major customer of ours and accounted for 11% of our total revenue for the fiscal year ended March 31, 2023.”¹⁰¹ In addition, Arm stated that “our involvement in such litigation *could cause us to incur significant reputational damage in the industry, in our relationship with Qualcomm or in our relationship with other third-party partners.*”¹⁰²

66. Further, despite claiming “harm to goodwill is a quantitative conclusion,” Dr. Kennedy identifies no methodology that would measure prospective harm to goodwill. Neither does Dr. Kennedy explain how the “available methodologies” he asserts earlier in his report would include the prospective harm to Arm’s goodwill.

⁹⁹ Kennedy Report, p. 95.

¹⁰⁰ ARM_01259705 – 0105 at 735 – 736.

¹⁰¹ ARM_01259705 – 0105 at 754 (emphasis added).

¹⁰² ARM_01259705 – 0105 at 754 (emphasis added).

VII. OTHER ISSUES

67. This report represents my analysis, opinions, and conclusions at this time and is based on information available to me as of the date above. The citations listed in this report are illustrative, and as part of my analysis, I also considered the additional documents and other information listed on Schedule 2. If additional information or testimony becomes available to me, I may revise or supplement my analysis, opinions, and conclusions, and I may modify or supplement my report as necessary. I may testify at trial regarding any related matter raised by the parties after the date of this report if asked to do so by the Court or the parties' attorneys. I may be asked to develop additional schedules or exhibits for trial purposes related to my analysis, opinions, and conclusions. I may also be asked to develop and rely on demonstratives at trial or any pre-trial proceeding. I may also be asked to develop additional schedules or exhibits if asked to do so by the Court or the parties' attorneys, post-trial. This report is intended solely for use in the above-referenced litigation and is not to be used for any other purpose.

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Certifications

Certified Public Accountant, Texas
Certified Valuation Analyst

Professional Affiliations

State Bar of Texas' Grievance
Committee, Committee Member,
2004 – 2009

Federal Bar Association,
South Texas Chapter, Treasurer,
2007 – 2015

Institution for Law and Technology
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Associations

American Institute of Certified
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Texas Society of Certified Public
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Licensing Executives Society

National Association of Certified
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Education

Master of Accounting
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BS Management
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W. Todd Schoettelkotte is a Senior Managing Director of Ocean Tomo, a part of J.S. Held LLC, a global consulting firm providing specialized technical, scientific, financial, and advisory services. Mr. Schoettelkotte has more than 25 years of experience in the evaluation and quantification of economic damages arising from patent, copyright and trademark infringement, and trade secret misappropriation disputes. His clients have included numerous Fortune 500 companies in a wide variety of industries including semiconductor, telecommunication, energy, consumer products, life sciences and computers (hardware, software and the internet). Mr. Schoettelkotte has been recognized by Intellectual Asset Management Magazine as one of the leading patent damages experts in the United States. Mr. Schoettelkotte's background is in accounting, finance and economics, and he has a specific, focused understanding of those issues integral to the valuation and management of intellectual property.

Intellectual Property Valuation

Mr. Schoettelkotte has directed numerous valuation projects related to patents, trademarks and trade secrets. A significant portion of his practice is focused on the determination of royalty rates and terms for licensing agreements. Additionally, Mr. Schoettelkotte has conducted numerous studies involving lost profits and unjust enrichment.

In the process of assisting clients in the valuation of intellectual property assets, Mr. Schoettelkotte has participated in the identification and review of business plans, market studies, financial documents and other related information.

Patent, Copyright and Trademark Infringement

Mr. Schoettelkotte has performed market analyses/studies wherein the patented, trademarked or copyrighted product is sold, assessed lost profits stemming from alleged infringements, evaluated the contribution of the patented process/method to the end product and established the economic value of the underlying intellectual property.

Mr. Schoettelkotte is skilled in the application of the Georgia-Pacific factors to the determination of reasonable royalty rates. He has determined reasonable royalty rates within infringement suits on many occasions in numerous industries. Over the course of his career, Mr. Schoettelkotte has reviewed hundreds of license agreements, providing a broad frame of reference for reasonable royalty damages analyses. Mr. Schoettelkotte has testified in federal and state court and arbitration proceedings on matters involving intellectual property valuation, lost profits, reasonable royalty and economic damages issues.

Articles and Presentations

"Intellectual Property Damages," Chicago-Kent College of Law, October 15, 2019

"Damages in Other Areas of Intellectual Property," The University of Arizona IP Conference, March 5, 2018

W. Todd Schoettelkotte

“Impact of Recent Court Cases on ‘Real World’ Royalty Rates,” LES (USA & Canada) Houston Chapter, July 20, 2017

“What is Discoverable and Admissible for Damages, Willfulness and Other Purposes,” Intellectual Property Owners Association, March 21, 2011

“Strategies in Intellectual Property,” Chicago Kent, College of Law, Spring 2004 – 2010

Damages, Part II: “Litigation Strategies” – 15th Annual Advanced Patent Law Institute - University of Texas School of Law, October 28-29, 2010

“IP Damages and Valuation,” Global Intellectual Property Management, Georgetown University Law Center, July 2, 2008

“Keys for Effectively Working with Your Damages Expert Throughout the Litigation Life Cycle,” Houston Bar Association, March 22, 2007

“Advanced Evidence and Discovery – Working With Experts From Start To Finish” – Texas Bar Association, April-May 2006

“Trademarks – Financial Disclosure and Corporate Governance” – International Trademark Association, Emerging Issues in Trademark Law Forum, February 2-3, 2006

“Valuation of IP – A Licensing Perspective” – Lighthouse Seminar Group, IP Licensing Nuts & Bolts, March 3, 2005

“Measuring the Value of Damages in Trademark Infringement Claims” – DuPont’s 18th Annual CLE Intellectual Property Law Seminar, October 12, 2004

“Measuring the Value of Damages in Patent and Trademark Claims” – Houston CPA Society, September 2004

“Measuring Damages in Trademark Infringement and Related Claims in Light of Recent Court Decisions” – The 19th Annual Intellectual Property Law Conference – American Bar Association, April 1, 2004

“Intellectual Property Damages: Patents & Trademarks” – Houston CPA Society “Litigation and Valuation Services Committee,” January 28, 2004

Co-Author: “Accounting for Attorneys” – University of Oregon School of Law, November 12, 2003

“What are the Financial Stakes in Litigation? What are the Costs and the Return on Investment (ROI) That Can Be Expected? The Question of Intangible Returns?” – 2003 Fourth International Conference on Intellectual Property by CNCPI, October 7, 2003, Paris, France

“Current Issues in the Analysis of Reasonable Royalties in Patent Infringement Actions” – 2003 Licensing Executives Society Annual Meeting, September 24, 2003

Co-Author FTI Consulting Training Course: “Calculating Damages in Patent Infringement – A Lost Profits and Reasonable Royalty Case Study,” July 17, 2003



**W. Todd Schoettelkotte
Four Year List of Testimony
As of March 2024**

CASE DESCRIPTION / TYPE OF TESTIMONY

In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same (Respondents); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Hearing

Demaray LLC v. Samsung Electronics Co. Ltd., et al.; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition, Supplemental Report, Deposition, Second Supplemental Report, Deposition, Trial

Ningde Ampere Technology Limited v. Zhuhai CosMX Battery Co., Ltd., et al.; U.S. District Court, Eastern District of Texas (Marshall), Initial Report, Rebuttal Expert Report, Deposition, Trial

HID Global Corporation v. Vector Flow., et al.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Trial

Persawvere, Inc. v. Milwaukee Electric Tool Corporation; U.S. District Court, District of Delaware (Wilmington), Rebuttal Expert Report, Deposition, Trial

Beacon Navigation GmbH v. Bayerische Motoren Werke AG; BMW of North America, LLC and BMW Manufacturing Co., LLC; U.S. District Court, Southern District of Michigan, Expert Report, Deposition

Plastipak Packaging, Inc. v. Nestlé Waters North America, Inc.; U.S. District Court, Eastern District of Virginia (Alexandria), Opening Expert Report, Rebuttal Expert Report, Supplemental Expert Report, Supplemental Rebuttal Expert Report, Deposition

Ollnova Technologies Limited v. ecobee Technologies, ULC d/b/a Ecobee; U.S. District Court, Eastern District of Texas (Marshall), Rebuttal Expert Report, Deposition, Trial

EIS, Inc. v. IntiHealth GER GmbH, et al.; U.S. District Court, District of Delaware, Expert Report, Rebuttal Expert Report, Commercial Success Report, Reply Report, Trial

BlueRadios, Inc. v. Kopin Corporation, Inc.; U.S. District Court, District of Colorado (Denver), Rebuttal Expert Report, Deposition, Supplemental Rebuttal Expert Report, Deposition

Bay Materials, LLC v. 3M Company; U.S. District Court, District of Delaware (Wilmington), Declaration, Deposition, Commercial Success Report, Deposition

Continuous Composites, Inc. v. Markforged, Inc.; U.S. District Court, District of Delaware, Expert Report, Reply Report, Deposition

Fate Therapeutics, Inc., et al. v. Shoreline Biosciences, Inc., et al.; U.S. District Court, Southern District of California (San Diego), Rebuttal Expert Report, Deposition

Delta Air Lines, Inc. v. Marriott International, Inc.; U.S. District Court, Northern District of Georgia (Atlanta), Rebuttal Expert Report, Supplemental Rebuttal Report, Deposition



W. Todd Schoettelkotte
Four Year List of Testimony
As of March 2024

CASE DESCRIPTION / TYPE OF TESTIMONY

Textron Innovations Inc. v. SZ DJI Technology Co., Ltd., et al.; U.S. District Court, Western District of Texas (Waco), Expert Report, Deposition, Supplemental Expert Report, Trial

VoIP-Pal.com, Inc. v. Verizon Communications Inc., et al.; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition

Ragnarok Game, LLC and ESDFOS, LLC v. ZeniMax Media Inc., et al.; Superior Court of the State of California, County of Los Angeles, Central District, Opening Expert Report, Rebuttal Expert Report, Deposition

DivX, LLC v. Harman International Industries, Inc.; New York Supreme Court, New York County, Expert Report, Rebuttal Expert Report, Deposition

Shimon Maimon v. Lockheed Martin Corporation; Judicial Arbitration and Mediation Services, Rebuttal Expert Report, Deposition, Arbitration

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. ZTE Corporation; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition

Wonderland Switzerland AG v. Evenflo Company, Inc.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Supplemental Expert Report, Trial

NNCrystal US Corporation and The Board of Trustees of The University of Arkansas v. Nanosys, Inc.; U.S. District Court, District of Delaware, Expert Report, Reply Report, Deposition

Pavemetrics Systems, Inc. v. Tetra Tech, Inc. and Tetra Tech Tas Inc.; U.S. District Court, Central District of California (Los Angeles), Expert Report, Deposition, Trial

Global Tubing, LLC v. Tenaris Coiled Tubes, LLC and Tenaris, S.A.; U.S. District Court, Southern District of Texas (Houston), Expert Report, Deposition

The Cookie Department, Inc. v. The Hershey Company, One Brands, LLC; U.S. District Court, Northern District of California (Oakland), Rebuttal Expert Report, Deposition

Unirac, Inc. v. EcoFasten Solar, LLC and Esdec, Inc.; U.S. District Court, District of Delaware, Expert Reports, Deposition

In the Matter of Certain Integrated Circuits, Chipsets, and Electronic Devices, and Products Containing the Same (Respondents); U.S. International Trade Commission, Washington, D.C., Rebuttal Expert Report, Deposition



**W. Todd Schoettelkotte
Four Year List of Testimony
As of March 2024**

CASE DESCRIPTION / TYPE OF TESTIMONY

In the Matter of Certain High-Density Fiber Optic Equipment and Components Thereof (Complainant); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Witness Statement, Hearing; Enforcement Proceeding - Expert Report, Supplement to the Expert Report, Deposition, 2nd Supplement to the Expert Report, 3rd Supplement to the Expert Report, Witness Statement, 4th Supplement to the Expert Report, Supplement to Witness Statement, Hearing

Blue Mountain Holdings, Ltd., et al. v. Bliss Nutraceuticals LLC, et al.; U.S. District Court, Northern District of Georgia (Atlanta), Expert Report, Deposition

Gibson Brands, Inc. v. Armadillo Distribution Enterprises, Inc. and Concordia Investment Partners, LLC; U.S. District Court, Eastern District of Texas (Sherman), Rebuttal Expert Report, Deposition, Supplemental Rebuttal Expert Report, Trial

Conformis, Inc. v. Medacta USA, Inc. and Medacta International SA; U.S. District Court, District of Delaware, Rebuttal Expert Report, Supplemental Rebuttal Expert Report, Deposition

In the Matter of Certain Silicon Photovoltaic Cells and Modules with Nanostructures, and Products Containing Same (Respondents); U.S. International Trade Commission (Washington, D.C.), Expert Report, Deposition, Witness Statement, Hearing

EcoFactor, Inc. v. Google LLC; U.S. District Court, Western District of Texas (Waco), Expert Report, Deposition, Supplemental Report, Trial, Declaration

G.W. Lisk Company, Inc. v. GITS Manufacturing Company; U.S. District Court, Southern District of Iowa (Central); Expert Report, Reply Report, Deposition

American Eagle Outfitters, Inc. and Retail Royalty Company v. Walmart, Inc.; U.S. District Court, Western District of Pennsylvania (Pittsburgh), Expert Report, Rebuttal Report, Deposition

Simply Wireless, Inc. v. T-Mobile US, Inc., et al.; U.S. District Court, Eastern District of Virginia (Alexandria), Expert Report, Reply Report, Deposition, Sur-Sur Reply Report

Gentex Corporation v. Galvion LTD and Galvion Inc.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition

Kirsch Research and Development, LLC v. DuPont de Nemours, Inc., FT Synthetics, Inc. and Atlas Roofing Corporation; U.S. District Court, Eastern District of Texas (Texarkana), Expert Report, Deposition

Malvern PanAnalytical Inc. v. TA Instruments-Waters LLC and Waters Technologies Corporation; U.S. District Court, District of Delaware (Wilmington), Expert Report, Rebuttal Report, Reply Report, Deposition

Finalrod IP, LLC v. Endurance Lift Solutions, Inc.; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Deposition

Pierce Manufacturing, Inc. and Oshkosh Corporation v. E-One, Inc. and REV Group, Inc.; U.S. District Court, Middle District of Florida (Tampa), Declaration, Expert Report, Deposition, Trial



**W. Todd Schoettelkotte
Four Year List of Testimony
As of March 2024**

CASE DESCRIPTION / TYPE OF TESTIMONY

Polar Electro Oy v. Suunto Oy, et al.; U.S. District Court, District of Utah (Central), Expert Report, Deposition

Wonderland Switzerland AG v. Evenflo Company, Inc., et al.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Trial

Lufkin Industries, Inc. v. International Business Machines Corporation, et al.; 159th Judicial District Court of Angelina County, Texas, Expert Report #1, Supplemental Report #1, Expert Report #2, Supplemental Report #2, Deposition

The Hillman Group, Inc. v. KeyMe, LLC; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Deposition #1, Consolidated Report, Deposition #2

Team Worldwide Corporation v. Academy, LTD d/b/a Academy Sports + Outdoors, et al.; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Rebuttal Report, Deposition #1, Deposition #2, Supplemental Report

Nevro Corp. v. Boston Scientific Corporation, et al.; U.S. District Court, Northern District of California (San Francisco), Expert Report, Supplemental Report, Deposition, Declaration

Carnegie Institution of Washington, et al. v. Pure Grown Diamonds, Inc., et al.; U.S. District Court, Southern District of New York (Foley Square), Expert Report, Supplemental Report, Deposition

In the Matter of Certain High-Density Fiber Optic Equipment and Components Thereof (Complainant); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Witness Statement, Hearing

Nissei ASB Co. and Nissei ASB Machine, Co., LTD. v. R&D Tool & Engineering Co.; U.S. District Court, Western District of Missouri (Western), Expert Report, Reply Report, Deposition

Jager Pro Incorporated v. Bull Creek Welding and Fabrication, Inc.; U.S. District Court, Eastern District of Arkansas (Central), Expert Report, Deposition

CFA Institute v. American Society of Pension Professionals & Actuaries, et al.; U.S. District Court, Western District of Virginia (Charlottesville), Expert Report, Deposition

Legacy Separators, LLC, et al. v. Halliburton Energy Services, Inc., et al.; U.S. District Court, Southern District of Texas (Houston), Expert Report, Rebuttal Report, Deposition, Supplemental Report, Second Supplemental Report, Deposition #2, Trial

Saracen LLC, Saracen Energy Power Advisors LP, Saracen Energy Advisors LP, collectively d/b/a The Saracen Group of Companies v. Sylvain Ross and Marginal Unit, Inc.; U.S. District Court, Southern District of Texas (Houston), Expert Report, Supplemental Report, Second Supplemental Report, Third Supplemental Report, Revised Third Supplemental Report, Trial

Innovation Sciences, LLC v. HTC Corporation; U.S. District Court, Eastern District of Texas (Sherman), Expert Report, Deposition

In the Matter of Certain Digital Video Receivers, Broadband Gateways, and Related Hardware and Software Components (Respondents); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Hearing

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

ARM_		ARM_		ARM_		ARM_		ARM_		ARM_	
Begin	End	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
00000003	00000003	00056882	00056894	00095579	00095579	01228039	01228039	01236610	01236612	01239464	01239464
00000017	00000018	00056900	00056909	00095580	00095580	01228040	01228040	01236613	01236615	01239465	01239465
00000019	00000021	00057479	00057481	00095789	00095790	01228041	01228041	01236616	01236617	01239466	01239466
00000022	00000023	00058159	00058163	00095791	00095791	01228042	01228042	01236618	01236644	01239467	01239469
00000045	00000045	00060458	00060512	00096011	00096011	01228043	01228043	01236645	01236653	01239470	01239470
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00000382	00000509	00063692	00063693	00097388	00097420	01228045	01228045	01236667	01236670	01239472	01239472
00000510	00000632	00067288	00067289	00097527	00097528	01228046	01228046	01236671	01236677	01239473	01239473
00002198	00002202	00079507	00079514	00098968	00099018	01228047	01228047	01236678	01236682	01239474	01239474
00002226	00002230	00081942	00081944	00104678	00104678	01228048	01228048	01236683	01236683	01239475	01239475
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00024815	00024815	00081962	00081963	00109734	00109750	01228050	01228050	01236691	01236697	01239477	01239477
00024817	00024817	00082714	00082716	00109778	00109778	01228051	01228051	01236698	01236699	01239478	01239478
00024819	00024819	00082717	00082717	00109791	00109803	01228052	01228052	01236700	01236702	01239479	01239479
00024820	00024820	00082925	00082937	00109806	00109819	01228053	01228053	01236703	01236707	01239483	01239483
00024825	00024825	00083356	00083356	00109822	00109852	01228054	01228054	01236708	01236710	01239485	01239485
00024826	00024826	00085677	00085677	00109855	00109865	01228055	01228055	01236711	01236730	01239486	01239486
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00024838	00024838	00085680	00085680	00109991	00109991	01228057	01228057	01236734	01236739	01239490	01239490
00024841	00024841	00085682	00085682	00110165	00110168	01228058	01228058	01236740	01236742	01239493	01239493
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00032604	00032604	00086164	00086245	00120302	00120303	01228061	01228061	01238999	01239003	01239789	01240096
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00040283	00040285	00087699	00087702	01215997	01216001	01228074	01228074	01239446	01239446	01240305	01240307
00040289	00040306	00087854	00087856	01226630	01226706	01228075	01228075	01239447	01239447	01240308	01240325
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00045250	00045253	00088045	00088303	01228027	01228027	01233718	01233718	01239449	01239449	01240354	01240381
00045262	00045264	00088371	00088386	01228028	01228028	01235135	01235137	01239450	01239450	01240382	01240391
00045266	00045276	00088390	00088408	01228029	01228029	01235144	01235144	01239451	01239451	01240392	01240412
00045334	00045335	00088655	00088655	01228030	01228030	01235148	01235148	01239452	01239452	01240413	01240437
00045393	00045393	00088656	00088684	01228031	01228031	01235149	01235149	01239453	01239453	01240438	01240447
00051071	00051073	00088892	00088903	01228032	01228032	01236577	01236579	01239454	01239457	01240448	01240448
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00052794	00052816	00092674	00092679	01228034	01228034	01236581	01236587	01239459	01239459	01240470	01240507
00056424	00056433	00092784	00092787	01228035	01228035	01236588	01236593	01239460	01239460	01240508	01240526
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00056519	00056529	00095370	00095449	01228037	01228037	01236596	01236604	01239462	01239462	01241589	01241589
00056538	00056552	00095578	00095578	01228038	01228038	01236605	01236609	01239463	01239463	01241597	01241598

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Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

ARM_		ARM_		QCARM_		QCARM_		QCARM_	
Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
01241616	01241620	01271927	01271928	0550518	0550529	3438038	3438074	3536902	3536905
01243410	01243629	01271929	01271953	0557206	0557207	3438075	3438113	3536921	3536933
01243875	01243995	01281879	01281879	0569461	0569494	3438114	3438152	3537376	3537378
01245599	01245617	01282466	01282575	0584330	0584332	3438153	3438193	3537713	3537715
01245618	01245618	01286878	01286998	0591730	0591732	3438194	3438234	3537773	3537776
01245619	01245640	01291202	01291202	0591733	0591736	3438235	3438275	3839896	3839911
01245641	01245672	01292638	01292644	0591737	0591740	3452409	3452442	3920067	3920067
01245673	01245703	01292866	01292866	0591741	0591745	3452662	3452664	7434227	7434227
01245704	01245705	01292867	01292914	0592425	0592431	3452665	3452667	7434228	7434229
01245706	01245719	01294035	01294036	2414807	2414813	3452668	3452672	7505464	7505464
01245720	01245726	01294037	01294038	2417783	2417783	3452720	3452723		
01245727	01245755	01296809	01296825	2423231	2423233	3452805	3452807		
01245756	01245793	01305479	01305479	2424464	2424466	3453808	3453810		
01245794	01245813	01305515	01305515	2424496	2424498	3453866	3453868		
01245814	01245837	01305785	01305789	2424621	2424623	3453870	3453872		
01245838	01245848	01309668	01309669	2425046	2425048	3453873	3453874		
01245849	01245890	01311070	01311084	2425297	2425299	3453875	3453877		
01245891	01245914	01425186	01425186	2426801	2426803	3453879	3453881		
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01245939	01245940	01427450	01427492	2426807	2426814	3457104	3457104		
01245941	01245978	01427493	01427522	2426815	2426821	3460229	3460233		
01245979	01246020	01427523	01427537	2426822	2426836	3460451	3460453		
01246021	01246042			2426837	2426852	3474751	3474828		
01246043	01246066			2426853	2426855	3519910	3519912		
01246067	01246085			2426856	2426881	3520810	3520812		
01246086	01246111			2426882	2426882	3520813	3520815		
01246112	01246134			2426883	2426884	3520816	3520818		
01246135	01246157			2426885	2426887	3520819	3520821		
01246158	01246194			2426888	2426888	3520822	3520825		
01246195	01246197			2426889	2426891	3520826	3520829		
01246198	01246224			2426892	2426894	3520830	3520834		
01246225	01246227			2426895	2426897	3522610	3522611		
01250306	01250306			2554114	2554116	3522895	3522902		
01250307	01250307			3241389	3241393	3526546	3526553		
01259704	01259704			3337797	3337799	3535535	3535535		
01259705	01260105			3400486	3400548	3535536	3535536		
01260121	01260391			3404294	3404353	3536628	3536629		
01260418	01260686			3426632	3426638	3536886	3536888		
01262030	01262366			3429791	3429872	3536889	3536891		
01266931	01266990			3434164	3434165	3536892	3536894		
01266995	01267070			3437962	3438003	3536895	3536897		
01271909	01271926			3438004	3438037	3536898	3536901		

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Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

Legal Documents and Related Exhibits

2022-08-31 - Complaint
 2022-09-30 - Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim
 2022-10-26 - Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim
 2023-02-27 - Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Interrogatories, Nos. 1-11
 2023-02-27 - Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Requests for Production, Nos. 1-36
 2023-02-27 - Defendants' Responses and Objections to Plaintiff's First Set of Interrogatories, Nos. 1-13
 2023-02-27 - Defendants' Responses and Objections to Plaintiff's First Set of Requests for Production, Nos. 1-51
 2023-04-04 - Arm Ltd.'s First Amended Objections and Responses to Qualcomm's First Set of Requests for Production, Nos. 1-36
 2023-04-26 - Corrected Second Amended Complaint for Willful Patent Infringement
 2023-05-04 - Defendants' Responses and Objections to Plaintiff's Second Set of Requests for Production, Nos. 52-58
 2023-05-05 - Arm Ltd.'s First Objection and Responses to Qualcomm's Second Set of Requests for Production, Nos 37-50
 2023-06-23 - Defendants' First Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories, Nos. 1-4 and 6
 2023-07-14 - Arm Ltd.'s First Objection and Responses to Qualcomm's Third Set of Requests for Production, Nos. 51-54
 2023-08-23 - Defendants' Responses and Objections to Plaintiff's Third Set of Requests for Production, Nos. 59-122
 2023-10-02 - Arm Ltd.'s Objections and Responses to Qualcomm's Second Set of Interrogatories, Nos. 12-19
 2023-10-02 - Plaintiff Arm Ltd.'s Objections and Responses to Defendant Qualcomm's Fourth Set of Requests for Production, Nos. 55-70
 2023-10-20 - Defendants' Responses and Objections to Plaintiff's First Set of Requests for Admission, Nos. 1-30
 2023-10-26 - Defendants' Supplemental and Amended Response and Objections to Plaintiff's First Set of Interrogatories, No. 5
 2023-10-26 - Correspondence Email from J. Braly to J. Li
 2023-10-27 - Defendants' Responses and Objections to Plaintiff's Second Set of Interrogatories
 2023-11-09 - Arm Ltd.'s Objections and Responses to Qualcomm's Third Set of Interrogatories, No. 20
 2023-11-17 - Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Second Set of Interrogatories, Nos. 12-19
 2023-11-17 - Arm Ltd.'s Objections and Responses to Qualcomm's Fourth Set of Interrogatories, Nos. 21-25
 2023-11-17 - Arm Ltd.'s Second Supplemental Objections and Responses to Qualcomm's First Set of Interrogatories, Nos. 1-11
 2023-11-17 - Arm Ltd.'s Supplemental Objections and Responses to Qualcomm's Third Set of Interrogatories, No. 20
 2023-11-17 - Defendants' First Supplemental Responses and Objections to Plaintiff's Second Set of Interrogatories, Nos. 15-16
 2023-11-17 - Defendants' Responses and Objections to Plaintiff's Fourth Set of Requests for Production, No. 123
 2023-11-17 - Plaintiff Arm Ltd.'s Objection and Responses to Defendant Qualcomm's Fifth Set of Requests for Production, Nos. 71-124
 2023-11-17 - Plaintiff Arm Ltd.'s Responses and Objections to Qualcomm's First Requests for Admissions to Plaintiff, Nos. 1-30

Deposition Transcripts and Related Exhibits

2023-09-22 - Rohit Singh	2023-11-02 - Lynn Couillard	2023-11-28 - Jim Thompson	2023-12-08 - Jonathan Armstrong
2023-10-12 - Manu Gulati	2023-11-03 - Gerard Williams	2023-11-28 - Michael Roberts	2023-12-12 - Rene Haas
2023-10-20 - Ramakrishna Chunduru	2023-11-08 - Ziad Asghar	2023-11-29 - Lynn Bos	2023-12-14 - Vivek Agrawal
2023-10-25 - Jignesh Trivedi	2023-11-09 - Paul Williamson	2023-11-30 - Karthik Shivashankar	2023-12-14 - Laura Sand
2023-10-25 - Tim Herbert	2023-11-15 - Christiano Amon	2023-12-01 - Pradeep Kanapathipillai	2023-12-19 - Christine Tran
2023-10-27 - Nitin Sharma	2023-11-15 - Richard Grisenthwaite	2023-12-07 - Mark Werkheiser	2023-12-20 - Ian Thornton
2023-10-27 - Will Abbey	2023-11-16 - Simon Segars	2023-12-08 - Geeta Balakrishnan	

Expert Reports

2024-02-27 - Expert Report of Patrick F. Kennedy, PhD.

Publicly Available Information/Other

Ampere's Second Mot. for Protective Order
 Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023
 Arm Holdings plc Form 424(b)(4), September 14, 2023

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

Publicly Available Information/Other (cont.)
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<p>Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023</p> <p>Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024</p> <p>Arm Holdings plc FQ3 2024 Results Presentation, February 7, 2024</p> <p>Arm Holdings plc Q2 FY 2024 Key Financial Data</p> <p>Arm Holdings plc Q2 FY 2024 Shareholder Letter</p> <p>Arm Holdings plc Q3 FY 2024 Key Financial Data</p> <p>Arm Holdings plc Q3 FY 2024 Shareholder Letter</p> <p>Bhandarkar, Dileep, and Douglas W. Clark. "Performance from architecture: comparing a RISC and a CISC with similar hardware organization." Proceedings of the fourth international conference on Architectural support for programming languages and operating systems. 1991</p> <p>Hearing Transcript, September 29, 2023</p> <p>https://9to5mac.com/2019/11/15/three-former-apple-execs-create-new-chip-company-will-compete-with-intel-and-amd/</p> <p>https://aws.amazon.com/what-is/cpu/</p> <p>https://community.fs.com/article/what-is-a-server-cpu.html</p> <p>https://download.intel.com/newsroom/kits/40thanniversary/pdfs/What_is_a_Microprocessor.pdf</p> <p>https://futurumgroup.com/about-us/who-we-are/</p> <p>https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-oryon-cpu-aim-to-disrupt-the-pc-market/</p> <p>https://hbr.org/2022/08/in-uncertain-times-the-best-strategy-is-adaptability</p> <p>https://investor.qualcomm.com/segments/qct</p> <p>https://investors.arm.com/static-files/187d293b-42eb-48b0-b82f-e78bce4da9e4</p> <p>https://medium.com/silicon-reimagined/performance-delivered-a-new-way-8f0f5ed283d5</p> <p>https://mixed-news.com/en/samsung-xr-devices-will-use-google-and-qualcomm-tech/</p> <p>https://newsroom.arm.com/news/arm-announces-closing-of-initial-public-offering</p> <p>https://nvidianews.nvidia.com/news/nvidia-introduces-grace-cpu-superchip</p> <p>https://pc-tablet.com/qualcomm-throws-down-the-gauntlet-snapdragon-xr2-gen-2-challenges-apples-vision-pro-in-mixed-reality-race/</p> <p>https://podcasts.apple.com/us/podcast/qualcomm-ceo-on-what-he-really-thinks-of-apple/id1091374076?i=1000565773375</p> <p>https://seekingalpha.com/article/4422252-qualcomm-incorporateds-qcom-ceo-steve-mollenkopf-on-q2-2021-results-earnings-call-transcript</p> <p>https://semiengineering.com/knowledge_centers/integrated-circuit/ic-types/processors/central-processing-unit-cpu/</p> <p>https://support.microsoft.com/en-us/windows/common-pc-and-device-terms-4542f069-4cf7-431a-bb6b-c6cbdbe3e6e9</p> <p>https://techcrunch.com/2020/09/24/nuvia-series-b</p> <p>https://viewpoint.pwc.com/dt/us/en/pwc/pwc_sec_volume/pwc_sec_volume_US/8000_registration_an_US/sec_8110_form_f1_US.html#pwc-topic.dita_fb3ce65d-0b9d-4db7-92ff-4e1fd99ba885</p> <p>https://web.archive.org/web/20210115193713/https://nuviainc.com/</p> <p>https://web.archive.org/web/20210316180114/https://nuviainc.com/</p> <p>https://web.archive.org/web/20210422062904/https://nuviainc.com/nuvia-raises-53-million-to-reimagine-silicon-design-for-the-data-center/</p> <p>https://www.americanbar.org/groups/tort_trial_insurance_practice/committees/automobile-litigation/safety_regulatory_considerations/</p> <p>https://www.androidauthority.com/mobile-processors-2022-2741344/</p> <p>https://www.arm.com/architecture/cpu</p> <p>https://www.arm.com/glossary/adas</p> <p>https://www.arm.com/glossary/connected-devices</p> <p>https://www.arm.com/glossary/cpu</p> <p>https://www.arm.com/glossary/iot-devices</p> <p>https://www.arm.com/glossary/isa</p> <p>https://www.arm.com/glossary/risc</p> <p>https://www.arm.com/glossary/smart-devices</p> <p>https://www.arm.com/glossary/soc-development</p> <p>https://www.arm.com/partners</p>
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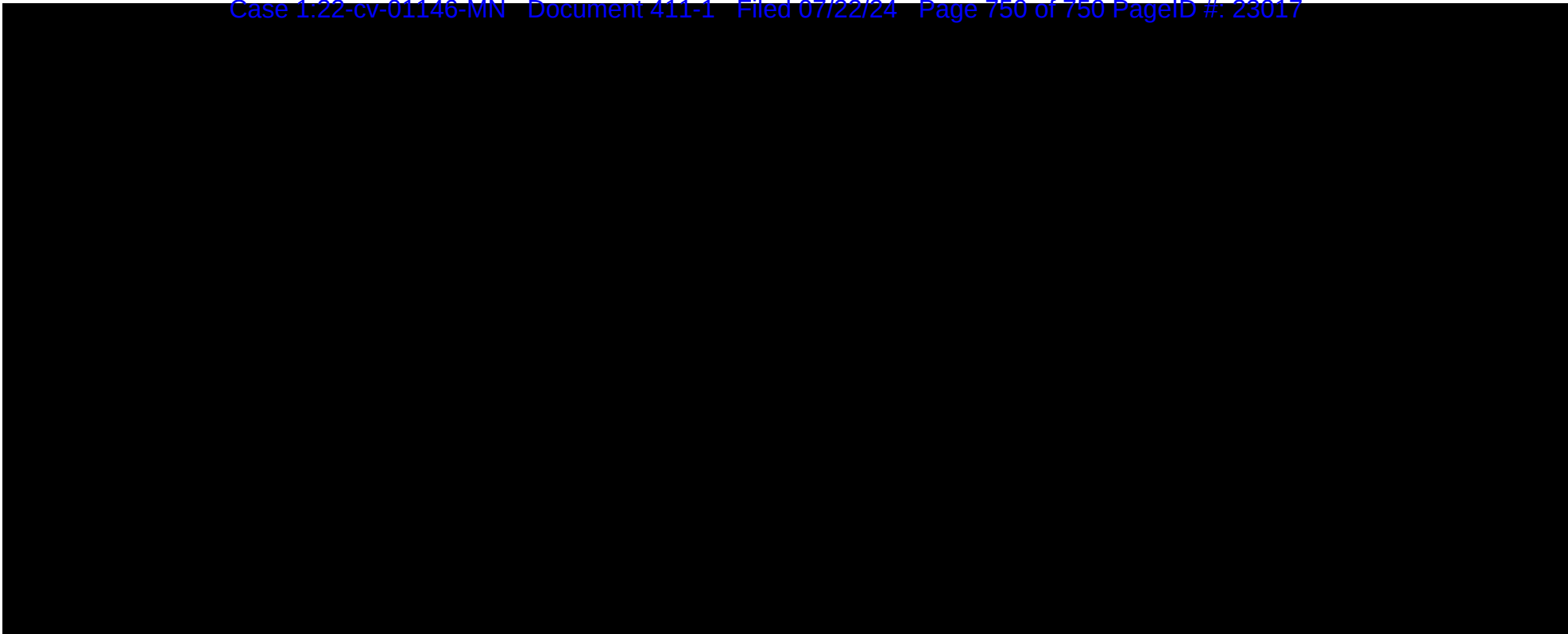
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